

Site Plan Review

Saratoga Way, Lots 112 & 113

Portsmouth, New Hampshire

PREPARED FOR:

Raleigh Way Holding Group, LLC

PREPARED BY:

ROSS ENGINEERING, LLC

Civil/Structural Engineering
& Surveying

909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

LIST OF PROJECT PLANS:

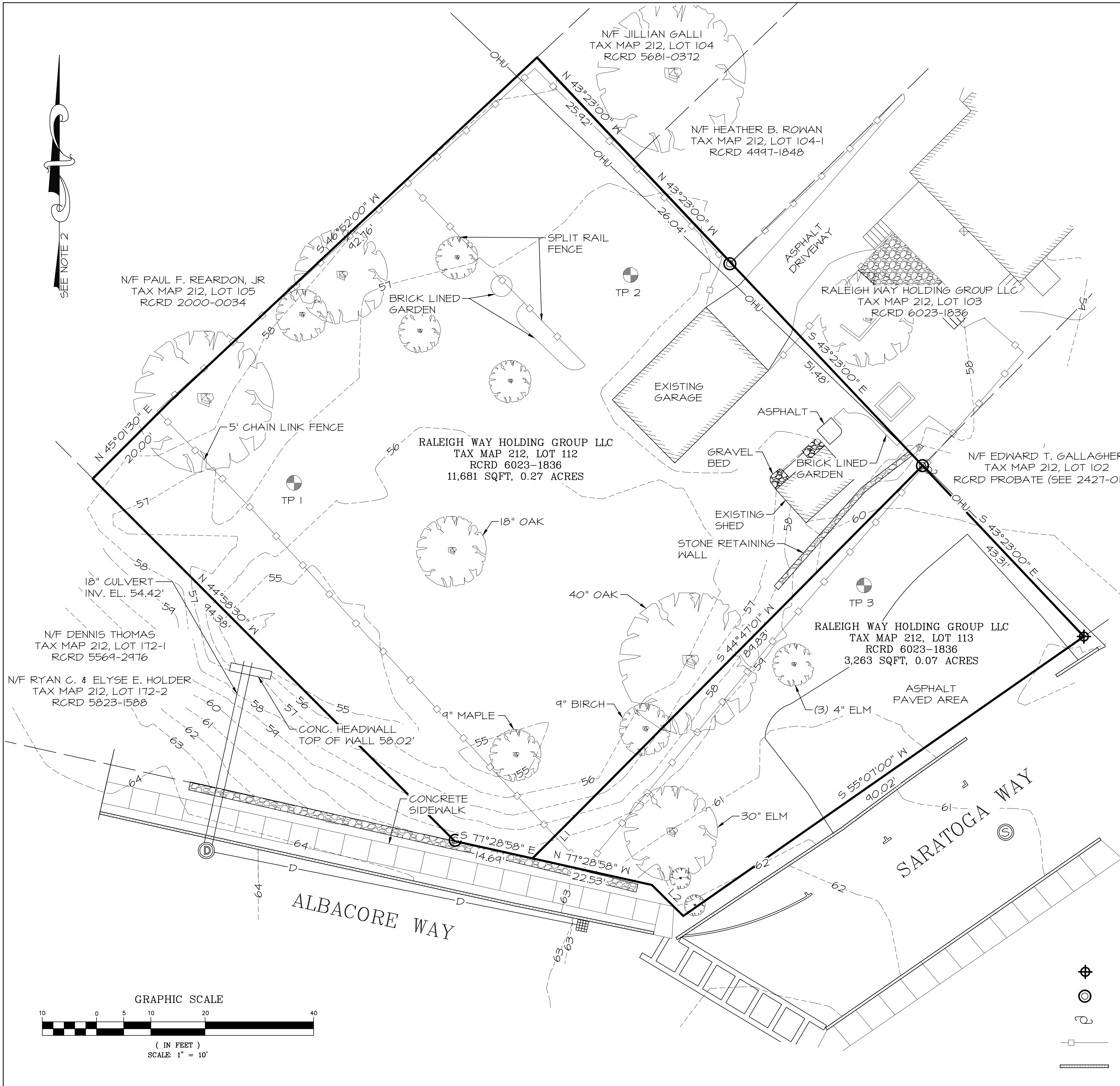
SITE PLAN SET

- 1 - Existing Conditions
- 2 - Site Plan
- 3 - Utility Plan
- 4 - Grading & Drainage
- 5 - Landscape Plan
- 6 - Roadway Plan
- 7 - Erosion Control Plan
- 8 - Details
- 9 - Pavement Details
- 10 - Notes

ARCHITECTURAL PLAN SET

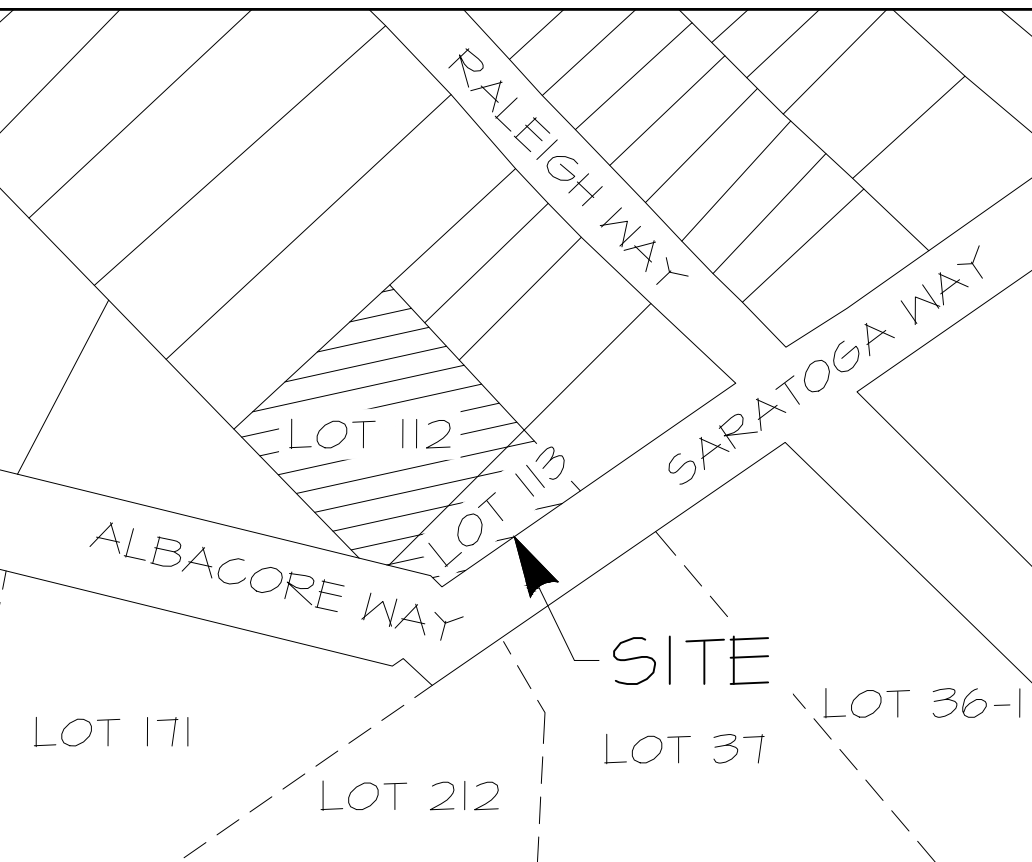
- Color Rendering
- A1 - Proposed West & East Elev.
- A2 - Proposed South & North Elev.
- A3 - First Floor Plan
- A4 - Second Floor Plan
- A5 - Third Floor (Attic) Plan
- A6 - First Floor Plan, Unit #1

January 7, 2021



NOTES

- 1) OWNER OF RECORD:
 RALEIGH WAY HOLDING GROUP LLC
 1 MIDDLE STREET SUITE 1
 PORTSMOUTH, NH 03801
 SITE LOCATION:
 SARATOGA WAY
 TAX MAP 212, LOT 103
 RCRD: 6023-1836
 AREA: 14,944 SF, 0.34 ACRES
 PARCELS 2 AND 3
- 2) BASIS OF BEARING AS PER REF. PLAN #2.
- 3) PARCEL IS IN GENERAL RESIDENCE B ZONE (GRB):
 MINIMUM LOT AREA.....5,000 SF
 MIN. LOT AREA PER DWELLING UNIT.....5,000 SF
 MINIMUM FRONTAGE.....80 FT
 MINIMUM DEPTH.....60 FT
 SETBACKS:
 FRONT.....5 FT
 SIDE.....10 FT
 REAR.....25 FT
 MAXIMUM BUILDING HEIGHT:
 SLOPED ROOF.....35 FT
 FLAT ROOF.....30 FT
 MAXIMUM BUILDING COVERAGE.....30%
 MINIMUM OPEN SPACE.....25%
- 4) THE PARCEL IS NOT WITHIN A FEMA FLOOD ZONE, AS PER FLOOD INSURANCE RATE MAP #33015C0259E, PANEL 259 OF 681. DATED MAY 17, 2005.
- 5) VARIANCES WERE GRANTED ON THE JUNE 16, 2020 ZBA MEETING
 A) TO ALLOW 3,736 SF PER DWELLING UNIT
 B) A SPECIAL EXCEPTION FROM SECTION 10.440 USE #1.51 TO ALLOW 4 DWELLING UNITS.



**LOCUS PLAN
N.T.S.**

REFERENCE PLANS

- 1) "PROPERTY MAP OF ATLANTIC HEIGHTS COMPANY FOR ATLANTIC HEIGHTS DEVELOPERS", BY LOCKWOOD, GREENE & CO. ENGINEERS, JULY, 1919. RCRD 0247.
- 2) "ATLANTIC HEIGHTS CO., PORTSMOUTH, N.H., PLAN SHOWING ADDITIONS TO AND REVISION OF LAYOUT PLAN OF 1919", BY JOHN W. DURGIN, C.E., DATED MAY, 1925. RCRD 0273
- 3) "SUBDIVISION PLAN MAP 212 - LOT 104 FOR JAMES A. MULEY LIVING TRUST & PETER BROWN", BY AMBIT ENGINEERING, DATED SEPTEMBER, 2004. RCRD D-32010.
- 4) "SUBDIVISION PLAN MEADOW VIEW HEIGHTS CHANGING PLACES, LLC", BY AMES MSC ARCHITECTS & ENGINEERS, DATED MAY 2, 2006. RCRD D-33771
- 5) "CONDOMINIUM SITE PLAN "ATLANTIC POINTE" A CONDOMINIUM UNIT OWNERS ASSOCIATION", BY AMES MSC ARCHITECTS & ENGINEERS, DATED JULY 19, 2007. RCRD D-34872
- 6) "AS BUILT ROADWAY PLAN FOR ATLANTIC POINTE BUILDERS, LLC" BY MSC CIVIL ENGINEERS & LAND SURVEYORS, INC. DATED NOV. 17, 2010. NOT RECORDED.

ADDITIONAL ABUTTERS

TAX MAP 212

LOT 36-1
 MICHAEL B. & LEANNE L. POWER
 RCRD: 5692-0310

LOT 37
 LISA H. & THOMAS M. CONRAD
 RCRD: 5435-1874

LOT 121
 PHA HOUSING DEVELOPMENT, LTD.
 RCRD: 5452-0868

LOT 171-01
 GEORGE COURTOVICH
 RCRD: 4847-0230

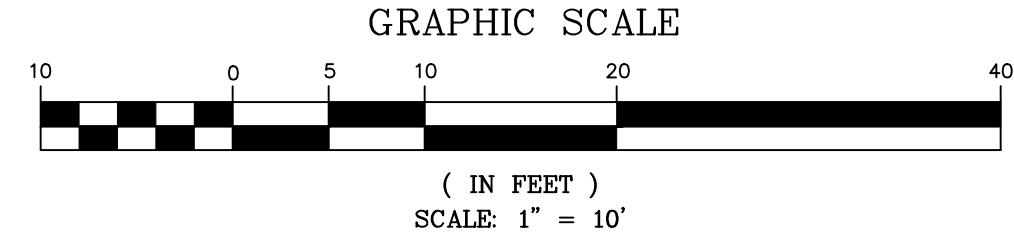
LOT 171-02
 JEFFREY T. VEINO
 RCRD: 4828-0417

I ALEX ROSS, HEREBY CERTIFY:
 A) THAT THIS SURVEY PLAT WAS PREPARED BY ME OR THOSE UNDER MY DIRECT SUPERVISION.
 B) THIS PLAN IS A RESULT OF FIELD SURVEY PERFORMED BY DDD, MGP & AR DURING NOVEMBER OF 2019 AND JULY 2020. THE ERROR OF CLOSURE IS BETTER THAN 1/15,000. SURVEY PER NHLSA STANDARDS; CATEGORY 1, CONDITION 1.
 C) "I CERTIFY THAT THIS SURVEY PLAT IS NOT A SUB-DIVISION PURSUANT TO THIS TITLE AND THAT THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED AND THAT NO NEW WAYS ARE SHOWN."

R. ALEX ROSS _____ DATE _____

LEGEND

- ⊕ MONUMENT TO BE SET
- ⊙ MONUMENT FOUND
- ⊕ UTILITY POLE
- 6' STOCKADE FENCE
- VERTICAL GRANITE CURB

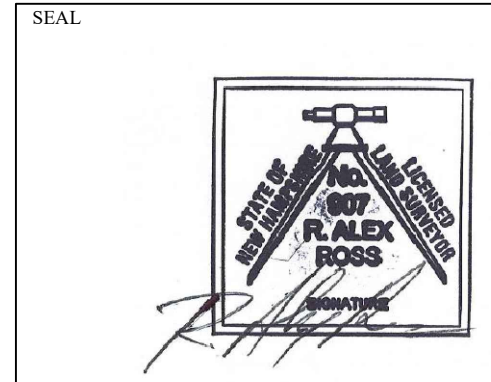


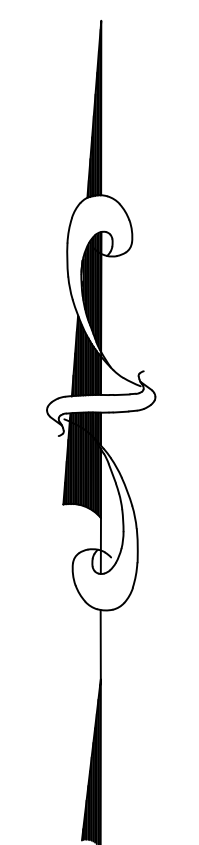
ISS.	DATE	DESCRIPTION OF ISSUE
7	1/7/2021	PB SUBMITTAL
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5	10/28/2020	PB SUBMITTAL
4	10/10/2020	REVISIONS
3	9/21/2020	TAC SUBMITTAL
2	8/17/2020	TAC SUBMITTAL
1	8/4/2020	TAC SUBMITTAL

CHECKED:	A.ROSS
DRAWN:	DDD
CHECKED:	A.ROSS

ROSS ENGINEERING, LLC
 Civil/Structural Engineering & Surveying
 909 Islington St.
 Portsmouth, NH 03801
 (603) 433-7560

TITLE EXISTING CONDITIONS for SARATOGA WAY Tax Map 212, Lots 112 & 113 Portsmouth, NH		
OWNER OF RECORD Raleigh Way Holding Group, LLC 1 Middle Street, Suite 1 Portsmouth, NH 03801	DWG. NO. 1 OF 10	ISSUE 7
JOB NUMBER 19-097	DWG. NO. 1 OF 10	ISSUE 7



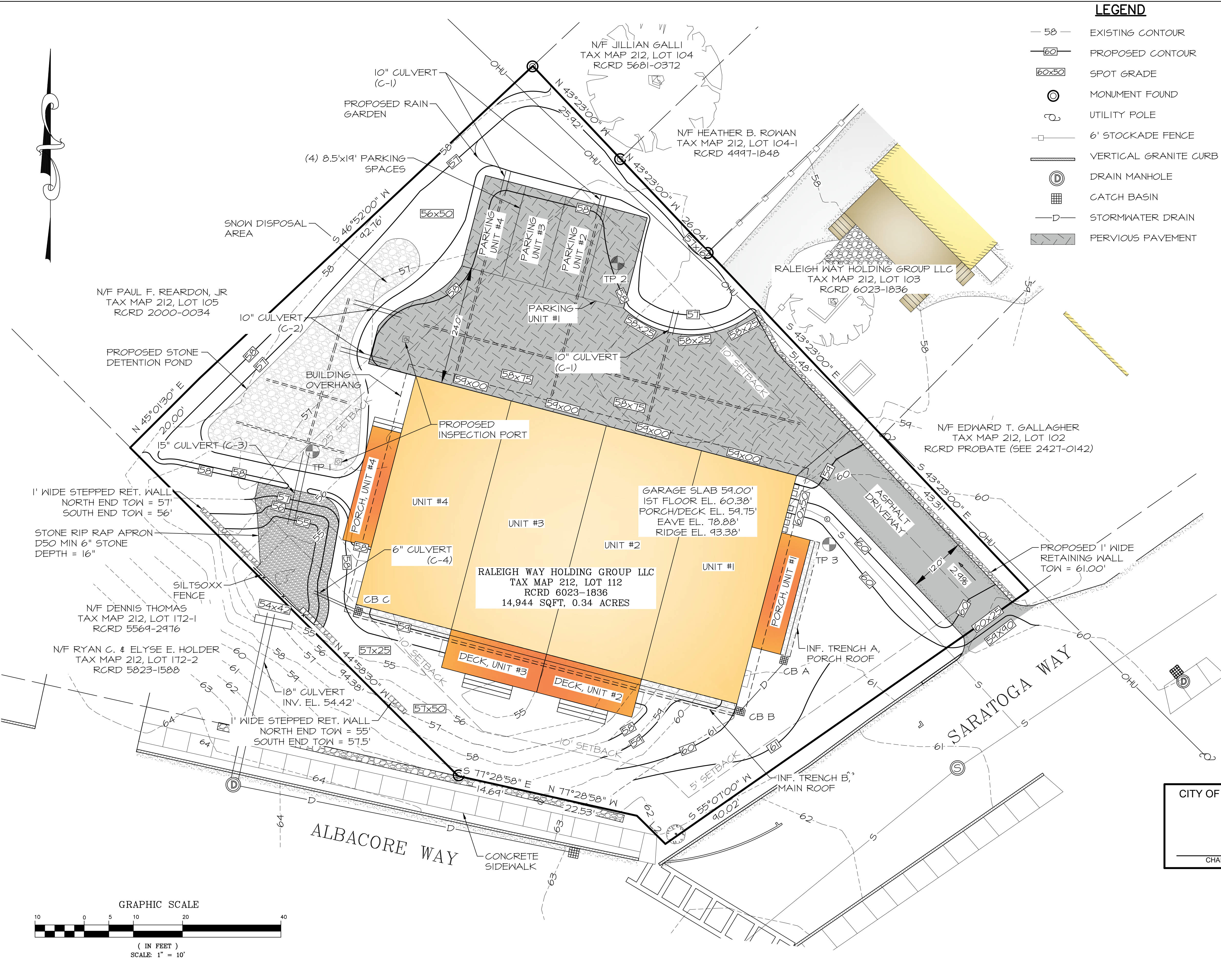


LEGEND

- 58 — EXISTING CONTOUR
- 60 — PROPOSED CONTOUR
- 60x50 SPOT GRADE
- ⊙ MONUMENT FOUND
- ⊙ UTILITY POLE
- 6' — 6' STOCKADE FENCE
- — VERTICAL GRANITE CURB
- ⊙ DRAIN MANHOLE
- ⊙ CATCH BASIN
- D — STORMWATER DRAIN
- ▨ PERVIOUS PAVEMENT

NOTES

- 1) OWNER OF RECORD:
RALEIGH WAY HOLDING GROUP LLC
1 MIDDLE STREET, SUITE 1
PORTSMOUTH, NH 03801
RCRD: 6023-1836
TAX MAP 212, LOTS 112 & 113
AREA: 14,944 SF, 0.34 ACRES
- 2) PARCEL IS IN GENERAL RESIDENCE B ZONE (GRB):
MINIMUM LOT AREA.....5,000 SF
MIN. LOT AREA PER DWELLING UNIT.....5,000 SF
MINIMUM FRONTAGE.....80 FT
MINIMUM DEPTH.....60 FT
SETBACKS:
FRONT.....5 FT
SIDE.....10 FT
REAR.....25 FT
MAXIMUM BUILDING HEIGHT:
SLOPED ROOF.....35 FT
FLAT ROOF.....30 FT
PROPOSED HEIGHT.....27.33 FT
MAXIMUM BUILDING COVERAGE.....30%
PROPOSED BUILDING COVERAGE.....27.6%
MINIMUM OPEN SPACE.....25%
PROPOSED OPEN SPACE.....43.6%
- 3) THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
- 4) ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THIS SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.
- 5) VARIANCES WERE GRANTED ON THE JUNE 16, 2020 ZBA MEETING
A) TO ALLOW 3,736 SF PER DWELLING UNIT
B) A SPECIAL EXCEPTION FROM SECTION 10.440 USE #1.51 TO ALLOW 4 DWELLING UNITS.
- 6) CONTINUE VERTICAL GRANITE CURB TO DRIVEWAY APRON.



ISS.	DATE	DESCRIPTION OF ISSUE
7	1/7/2021	PB SUBMITTAL
6	12/3/2020	PB SUBMITTAL
5	10/28/2020	PB SUBMITTAL
4	10/10/2020	REVISIONS
3	9/21/2020	TAC SUBMITTAL
2	8/17/2020	TAC SUBMITTAL
1	8/4/2020	TAC SUBMITTAL

ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.

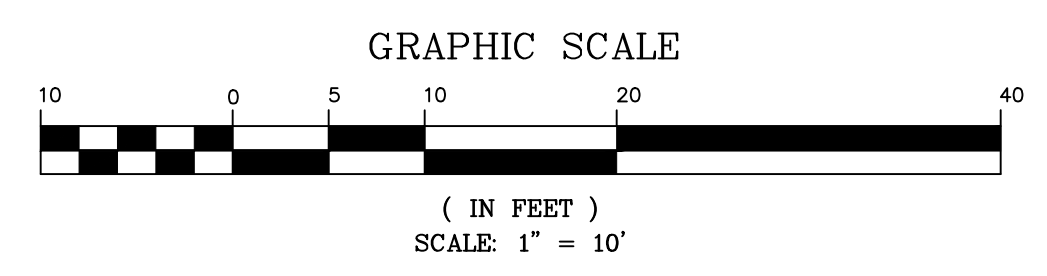
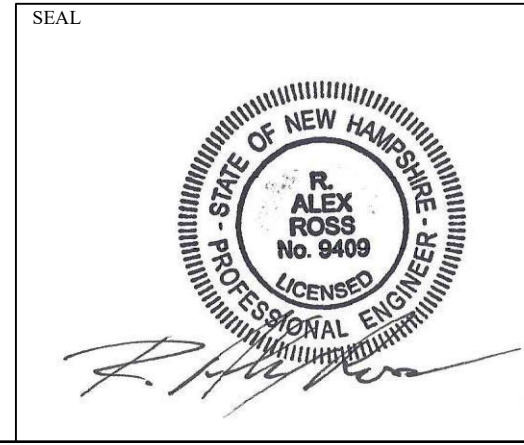
CITY OF PORTSMOUTH PLANNING BOARD

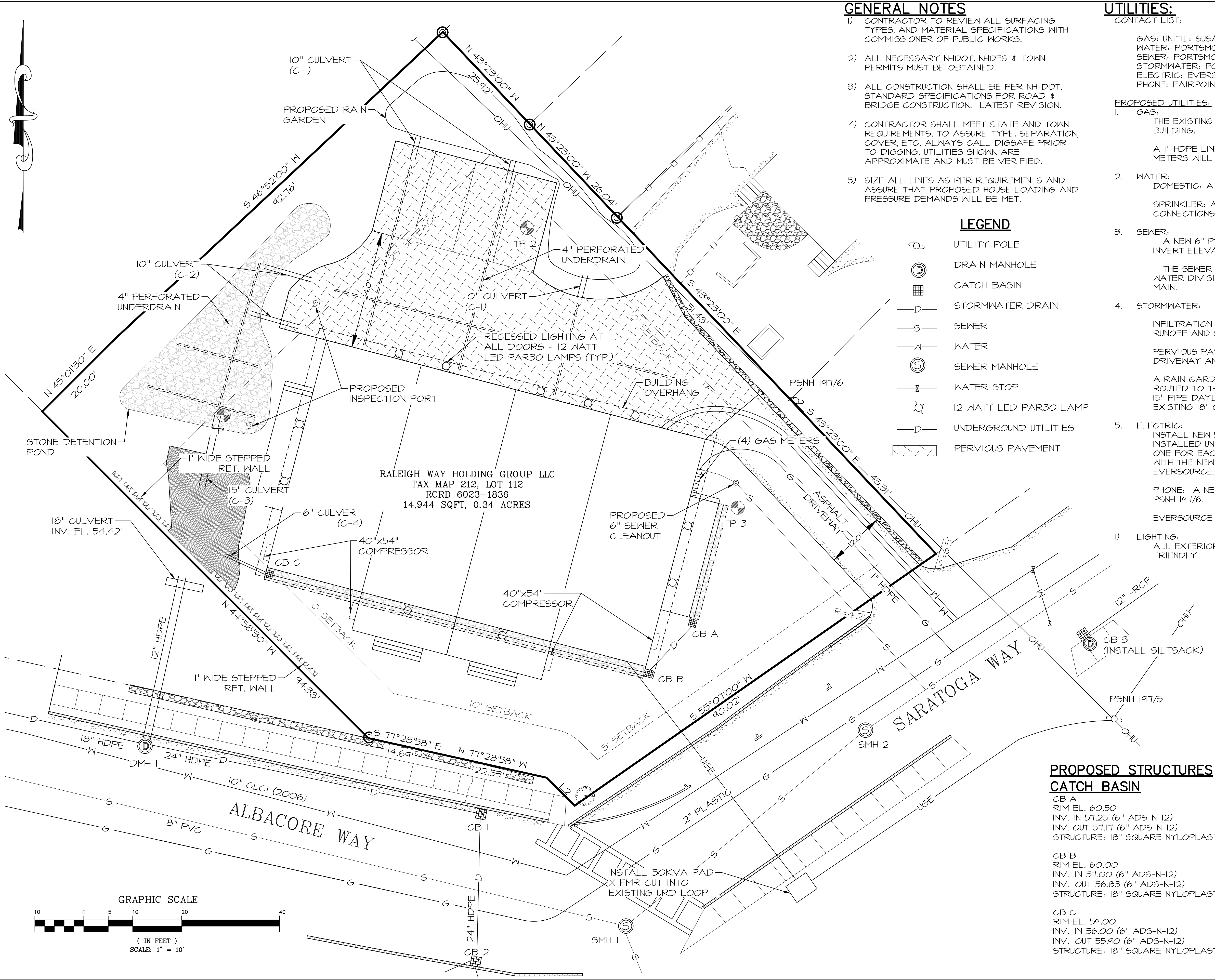
CHAIRPERSON _____ DATE _____

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SITE PLAN
for
SARATOGA WAY
Tax Map 212, Lots 112 & 113
Portsmouth, NH

OWNER OF RECORD
Raleigh Way Holding Group, LLC
1 Middle Street, Suite 1
Portsmouth, NH 03801





GENERAL NOTES

- 1) CONTRACTOR TO REVIEW ALL SURFACING TYPES, AND MATERIAL SPECIFICATIONS WITH COMMISSIONER OF PUBLIC WORKS.
- 2) ALL NECESSARY NHDOT, NHDES & TOWN PERMITS MUST BE OBTAINED.
- 3) ALL CONSTRUCTION SHALL BE PER NH-DOT, STANDARD SPECIFICATIONS FOR ROAD & BRIDGE CONSTRUCTION. LATEST REVISION.
- 4) CONTRACTOR SHALL MEET STATE AND TOWN REQUIREMENTS. TO ASSURE TYPE, SEPARATION, COVER, ETC. ALWAYS CALL DIGSAFE PRIOR TO DIGGING. UTILITIES SHOWN ARE APPROXIMATE AND MUST BE VERIFIED.
- 5) SIZE ALL LINES AS PER REQUIREMENTS AND ASSURE THAT PROPOSED HOUSE LOADING AND PRESSURE DEMANDS WILL BE MET.

UTILITIES:

- CONTACT LIST:**
- GAS: UNITIL: SUSAN L. DUPLISEA.....603-244-5147
 WATER: PORTSMOUTH DPW:603-427-1530
 SEWER: PORTSMOUTH DPW:603-427-1530
 STORMWATER: PORTSMOUTH DPW:603-427-1530
 ELECTRIC: EVERSOURCE: CASEY McDONALD.....603-436-7708 EXT 5641
 PHONE: FAIRPOINT: JOSEPH P. CONSIDINE.....603-790-4054
- PROPOSED UTILITIES:**
1. GAS:
 - THE EXISTING 2" PLASTIC INTERMEDIATE PRESSURE GAS MAIN WILL SERVE THE 4 UNIT BUILDING.
 - A 1" HDPE LINE WILL BE INSTALLED CONNECTING TO THE EXISTING GAS MAIN. 4 GAS METERS WILL BE INSTALLED.
 2. WATER:
 - DOMESTIC: A NEW 2" COPPER LINE WILL BE INSTALLED TO THE BUILDING
 - SPRINKLER: A 4" SPRINKLER LINE WILL BE INSTALLED. NECESSARY FLOW TEST CONNECTIONS AND SPECIFICATIONS AS PER CITY REQUIREMENTS.
 3. SEWER:
 - A NEW 6" PVC SEWER LATERAL SHALL BE CONNECTED TO THE 8" STREET MAIN. INVERT ELEVATION AT BUILDING SHALL BE 56.00'. SEE CROSS SECTION ON SHEET II
 - THE SEWER CONNECTION SHALL BE WITNESSED AND APPROVED BY THE PORTSMOUTH WATER DIVISION AND SOLID COUPLINGS WILL BE USED TO CUT IN THE SERVICE TO THE MAIN.
 4. STORMWATER:
 - INFILTRATION TRENCHES FOR THE SOUTHERN ROOF AND EASTERN PORCH ROOF STORE RUNOFF AND SLOWLY RELEASE IT TO THE 18" CULVERT.
 - PERVIOUS PAVEMENT IS PROPOSED TO COLLECT RUNOFF FROM THE ASPHALT DRIVEWAY AND NORTHERN ROOF.
 - A RAIN GARDEN IS PROPOSED TO COLLECT RUNOFF FROM THE NORTH. RUNOFF IS ROUTED TO THE PERVIOUS PAVEMENT SUB BASE, THEN TO A STONE DETENTION POND. A 15" PIPE DAYLIGHTS TO THE SOUTHWEST, SLOWLY RELEASING THE WATER TO THE EXISTING 18" CULVERT.
 5. ELECTRIC:
 - INSTALL NEW 50KVA PAD CUT INTO EXISTING LOOP. TWO NEW 4" CONDUITS ARE TO BE INSTALLED UNDERGROUND TO PROVIDE SERVICE. FOUR METERS ARE TO BE INSTALLED, ONE FOR EACH UNIT. ALL ELECTRIC WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE NEW HAMPSHIRE REQUIREMENTS FOR ELECTRIC SERVICE CONNECTIONS BY EVERSOURCE.
 - PHONE: A NEW 2" CONDUIT IS TO BE INSTALLED UNDERGROUND FROM UTILITY POLE PSNH 197/6.
 - EVERSOURCE WORK# 3446499
 - 1) LIGHTING:
 - ALL EXTERIOR LIGHTING SHALL COMPLY WITH CITY REGULATIONS AND BE DARK SKY FRIENDLY

LEGEND

- UTILITY POLE
- DRAIN MANHOLE
- CATCH BASIN
- STORMWATER DRAIN
- SEWER
- WATER
- SEWER MANHOLE
- WATER STOP
- 12 WATT LED PAR30 LAMP
- UNDERGROUND UTILITIES
- PERVIOUS PAVEMENT

EXISTING STRUCTURES

CATCH BASINS

- CB #1
RIM EL. 62.96
INV. IN 24" (HDPE = 53.36 NW)
INV. OUT 24" (HDPE = 53.10 S)
- CB #2
RIM EL. 62.89
INV. IN 12" (HDPE = 58.09 SE)
INV. IN 24" (HDPE = 52.97 N)
INV. OUT 24" (HDPE = 52.91 SW)

DRAIN MANHOLES

- DMH 1
RIM EL. 64.12
INV. IN 12" (HDPE= 54.34 NW)
INV. IN 18" (HDPE= 54.21 NE)
INV. OUT 24" (HDPE= 54.14 SE)

SEWER MANHOLES

- SMH 1
RIM EL. 63.64
INV. IN 58.04 (8" PVC)
INV. IN 57.90 (8" PVC)
INV. OUT 57.84 (8" PVC)
- SMH 2
RIM EL. 61.17
INV. IN 56.26 (8" PVC)
INV. OUT 56.16 (8" PVC)

PROPOSED STRUCTURES

CATCH BASIN

- CB A
RIM EL. 60.50
INV. IN 57.25 (6" ADS-N-12)
INV. OUT 57.17 (6" ADS-N-12)
STRUCTURE: 18" SQUARE NYLOPLAST
- CB B
RIM EL. 60.00
INV. IN 57.00 (6" ADS-N-12)
INV. OUT 56.83 (6" ADS-N-12)
STRUCTURE: 18" SQUARE NYLOPLAST
- CB C
RIM EL. 59.00
INV. IN 56.00 (6" ADS-N-12)
INV. OUT 55.90 (6" ADS-N-12)
STRUCTURE: 18" SQUARE NYLOPLAST

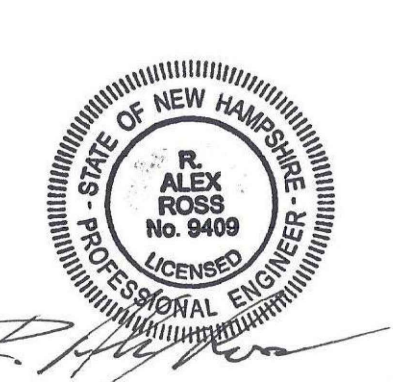
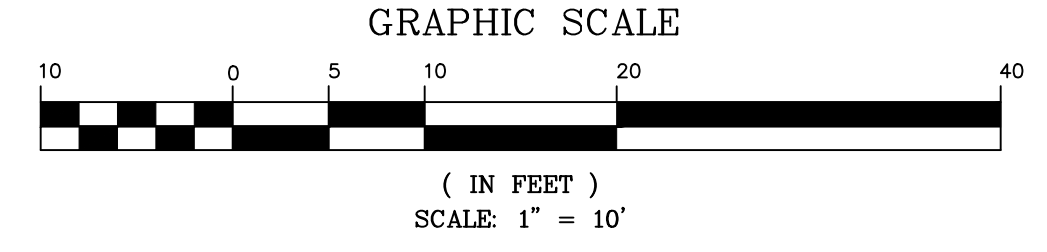
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TITLE
UTILITY PLAN
for
SARATOGA WAY
Tax Map 212, Lots 112 & 113
Portsmouth, NH

OWNER OF RECORD
Raleigh Way Holding Group, LLC
1 Middle Street, Suite 1
Portsmouth, NH 03801

JOB NUMBER: 19-097 DWG. NO.: 3 OF 10 ISSUE: 7

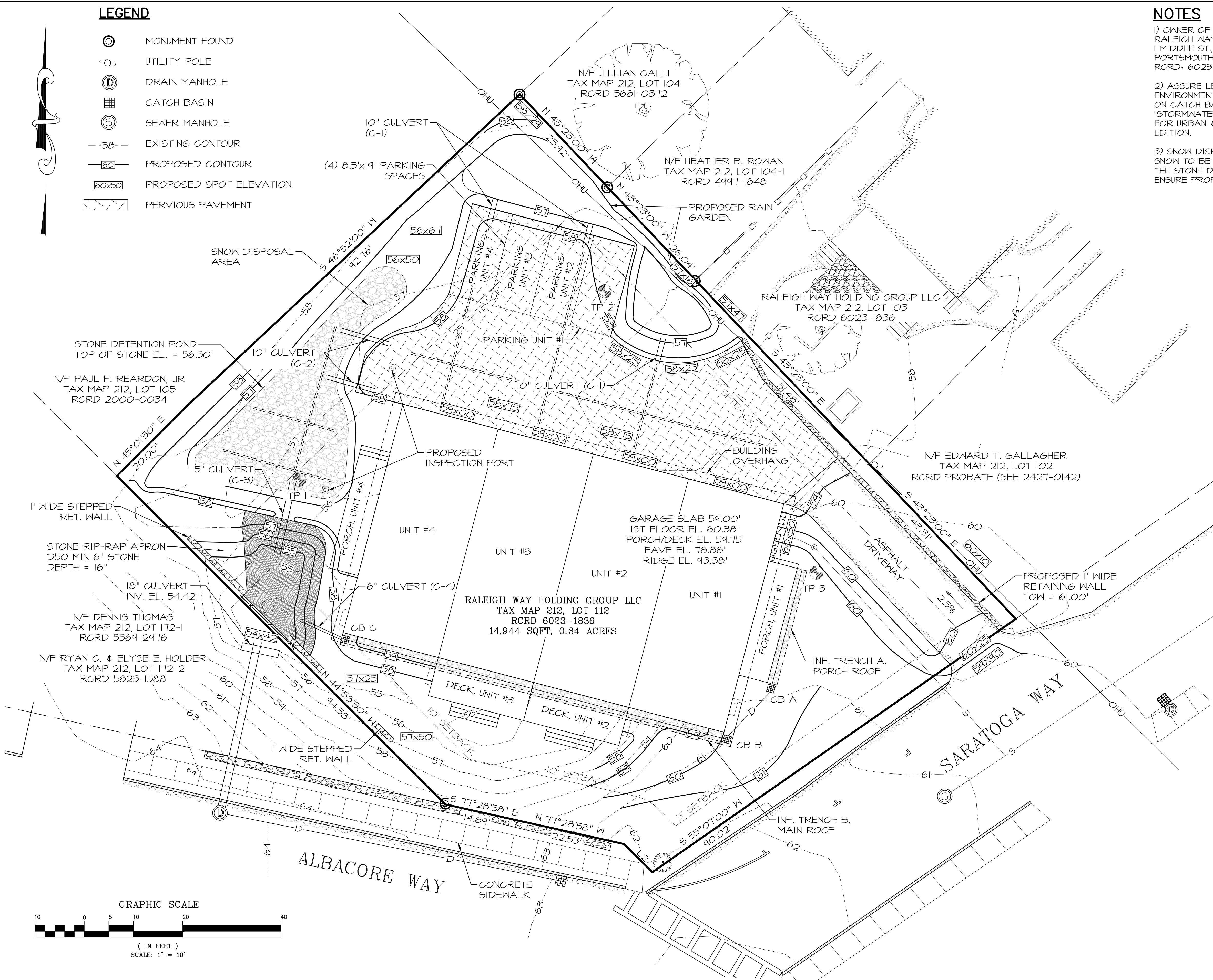


LEGEND

- MONUMENT FOUND
- UTILITY POLE
- DRAIN MANHOLE
- CATCH BASIN
- SEWER MANHOLE
- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED SPOT ELEVATION
- PERVIOUS PAVEMENT

NOTES

- 1) OWNER OF RECORD:
RALEIGH WAY HOLDING GROUP, LLC
1 MIDDLE ST., SUITE 1
PORTSMOUTH NH, 03801
RCRD: 6023-1836
- 2) ASSURE LEAST PRACTICAL DISTURBANCE OF THE PHYSICAL ENVIRONMENT. INSTALL SILTSACKS ON CATCH BASINS A, B, & C AND ON CATCH BASIN 3. FOLLOW NHDES REGULATIONS AND GUIDELINES IN "STORMWATER & EROSION & SEDIMENTATION CONTROL HANDBOOK FOR URBAN & DEVELOPING AREAS IN NEW HAMPSHIRE" LATEST EDITION.
- 3) SNOW DISPOSAL AREA
SNOW TO BE MOVED WEST ALONG THE 24' WIDE PARKING AREA TO THE STONE DETENTION POND. 4" UNDERDRAIN TO BE INSTALLED TO ENSURE PROPER DRAINAGE.



TEST PIT 1 (of 3)

DEPTH (INCHES)	COLOR	TEXTURE	STRUCTURE	CONSISTENCE
0	10 YR 1/2 DARK BROWN	FINE SANDY LOAM	WEAK FINE GRANULAR	MOIST FRIABLE
12	10 YR 1/2 BROWN	FINE SANDY LOAM	WEAK FINE SUBANGULAR BLOCKY	MOIST FRIABLE
24	10 YR 1/2 GRAYISH BROWN 1.5 YR 1/2 STRONG BROWN REDOXIMORPHIC CONCENTRATION AND 28 10 YR 1/2 LIGHT GRAY REDOXIMORPHIC DEPLETIONS	FINE SANDY LOAM	MASSIVE	DRY FIRM & RESTRICTIVE
42	2.5 YR 1/2 LIGHT OLIVE BROWN MANY REDOXIMORPHIC FEATURES	SILT LOAM	WEAK FLATY	DRY FIRM & RESTRICTIVE

ESKHT	24 INCHES	ROOTS	COMMON TO 30 INCHES	RESTRICTIVE LAYERS	24 INCHES
OBSERVED H2O	NONE	REFUSAL (INCHES)	NONE TO 64"		

NOTES: ALL PITS MARKED WITH PINK FLAGS EMBLAZONED WITH THE CORRESPONDING PIT #

TEST PIT 2 (of 3)

DEPTH (INCHES)	COLOR	TEXTURE	STRUCTURE	CONSISTENCE
0	10 YR 1/2 VERY DARK GRAYISH BROWN	FINE SANDY LOAM	WEAK FINE GRANULAR	DRY TO MOIST FRIABLE
10	10 YR 1/2 DARK YELLOWISH BROWN	FINE SANDY LOAM	WEAK FINE SUBANGULAR BLOCKY	MOIST FRIABLE
19	10 YR 1/2 GRAYISH BROWN 5.6 1.5 YR 1/2 STRONG BROWN REDOXIMORPHIC FEATURES AND 28 10 YR 1/2 LIGHT GRAY REDOXIMORPHIC DEPLETIONS	FINE SANDY LOAM	MASSIVE	DRY FIRM AND RESTRICTIVE
28	10 YR 1/2 GRAYISH BROWN COMMON REDOXIMORPHIC FEATURES	GRAVELLY FINE SANDY LOAM	MASSIVE	DRY FIRM
44	10 YR 1/2 BROWN 2.8 1.5 YR 1/2 STRONG BROWN REDOXIMORPHIC CONCENTRATIONS AND 28 10 YR 1/2 LIGHT GRAY REDOXIMORPHIC DEPLETIONS	ALTERNATING 2" LAYERS OF VERY FINE SANDY LOAM AND SILT LOAM	MASSIVE	DRY FRIABLE

ESKHT	18 INCHES	ROOTS	FEM	RESTRICTIVE LAYERS	NONE
OBSERVED H2O	NONE	REFUSAL (INCHES)	NONE TO 64"		

NOTES:

TEST PIT 3 (of 3)

DEPTH (INCHES)	COLOR	TEXTURE	STRUCTURE	CONSISTENCE
0	10 YR 1/2 VERY DARK GRAYISH BROWN	FINE SANDY LOAM	WEAK FINE GRANULAR	DRY TO MOIST FRIABLE
15	10 YR 1/2 DARK YELLOWISH BROWN	FINE SANDY LOAM	MASSIVE	DRY FRIABLE
30	10 YR 1/2 BROWN 1.0 1.5 YR 1/2 STRONG BROWN REDOXIMORPHIC CONCENTRATIONS	FINE SANDY LOAM	MASSIVE	DRY FIRM AND RESTRICTIVE

ESKHT	30 INCHES	ROOTS	FEM	RESTRICTIVE LAYERS	NONE
OBSERVED H2O	NONE	REFUSAL (INCHES)	NONE TO 60"		

NOTES:

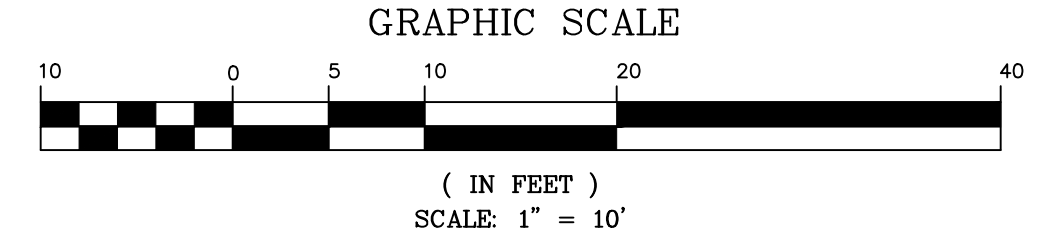
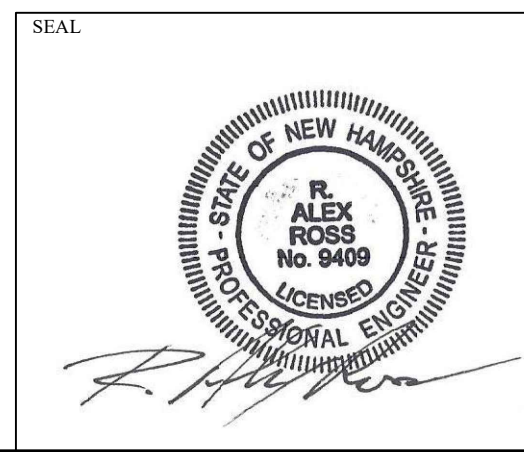
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ISS.	DATE	DESCRIPTION OF ISSUE
SCALE:	1" = 10'	
CHECKED:	A.ROSS	
DRAWN:	DDD	
CHECKED:	A.ROSS	

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TITLE GRADING & DRAINAGE PLAN
for
SARATOGA WAY
Tax Map 212, Lots 112 & 113
Portsmouth, NH

OWNER OF RECORD
Raleigh Way Holding Group, LLC
1 Middle Street, Suite 1
Portsmouth, NH 03801



CITY OF PORTSMOUTH PLANNING BOARD

CHAIRPERSON

DATE

ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.

NOTES

- 1) THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
- 2) ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THIS SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.

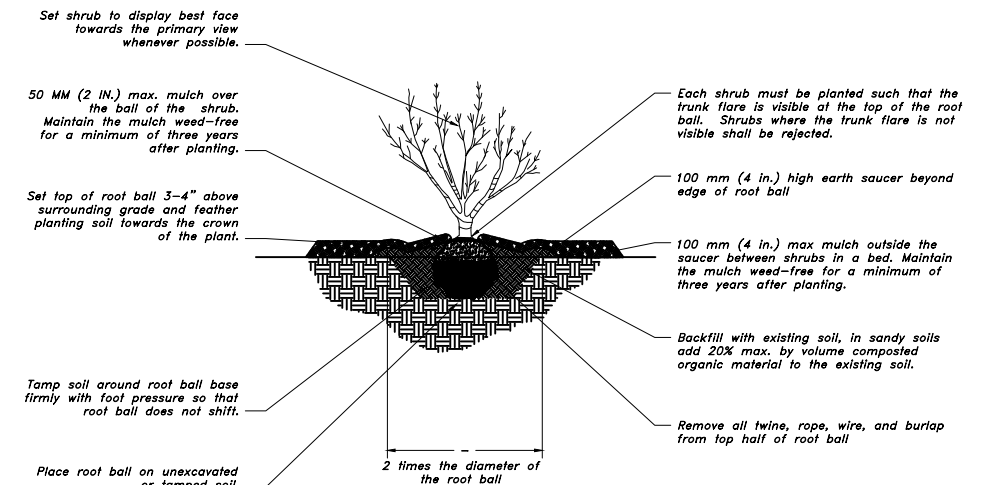
PLANTING NOTES

1. ALL PLANT MATERIALS SHALL BE FIRST QUALITY NURSERY GROWN STOCK.
2. ALL PLANTS SHALL BE PLANTED IN ACCORDANCE WITH NEW HAMPSHIRE LANDSCAPE ASSOCIATION STANDARDS AND GUARANTEED FOR ONE YEAR BY THE LANDSCAPE CONTRACTOR.
3. AFTER PLANTING, ALL PLANTS SHALL BE FLOODED AT THE BASE WITH WATER FROM A SLOW-RUNNING HOSE FOR 5 MINUTES EACH.
4. ALL PLANTS SHALL BE INSTALLED BEFORE ANY GRASS IS SEEDED.
5. ALL SHRUBS AND PLANTING BEDS SHALL BE MULCHED WITH 3" OF DARK BROWN AGED BARK MULCH AS A FINAL STEP. MULCH MUST BE KEPT 2" AWAY FROM BASE OF EACH PLANT.
6. THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS SHALL BE RESPONSIBLE FOR THE MAINTENANCE, REPAIR, AND REPLACEMENT OF ALL REQUIRED SCREENING AND LANDSCAPE MATERIALS.
7. ALL REQUIRED PLANT MATERIALS SHALL BE TENDED AND MAINTAINED IN A HEALTHY GROWING CONDITION, REPLACED WHEN NECESSARY, AND KEPT FREE OF REFUSE AND DEBRIS. ALL REQUIRED FENCES AND WALLS SHALL BE MAINTAINED IN GOOD REPAIR.
8. THE PROPERTY OWNER IS RESPONSIBLE FOR REMOVING AND REPLACING DEAD OR DISEASED PLANT MATERIALS IMMEDIATELY WITH THE SAME TYPE, SIZE, AND QUANTITY OF PLANT MATERIALS AS ORIGINALLY INSTALLED, UNLESS ALTERNATIVE PLANTINGS ARE REQUESTED, JUSTIFIED, AND APPROVED BY THE PLANNING BOARD OR PLANNING DIRECTOR.

INSTALLATION REQUIREMENTS:

1. THE INSTALLATION OF A DRIP IRRIGATION SYSTEM IS RECOMMENDED TO ASSURE WELL GROWN PLANTS.
2. IN CASE OF DROUGHT (DEFINED AS TWO WEEK PERIOD WITHOUT RAIN) ALL NEW PLANTS SHALL BE WATERED THROUGH NOVEMBER 1ST DURING THE FIRST SEASON IN WHICH THEY ARE INSTALLED. THEY SHALL BE WATERED ONE TIME PER DAY FOR THE FIRST WEEK AFTER INSTALLATION AND THREE TIMES PER WEEK FOR THE REMAINDER OF THE SEASON. AFTER THE FIRST SEASON WHEN THE ROOTS OF THE PLANTS ARE ESTABLISHED THEY WILL NOT REQUIRE WATERING.
3. SOAKER HOSES WOUND THROUGH THE BED NEAR THE BASE OF EACH PLANT ARE THE RECOMMENDED METHOD OF WATERING DURING THE FIRST SEASON. THESE CA BE REMOVED AFTER NOVEMBER 30TH WHEN THE PLANTS ARE ESTABLISHED.

Shrub Detail



LEGEND

- Pervious Pavement
- Grassed Area
- Hydrangea paniculata 'Limelight'
- Spiraea nipponica 'Snowmound'
- Thuja occidentalis 'Nigra'

ISS.	DATE	DESCRIPTION OF ISSUE
7	1/7/2021	PB SUBMITTAL
6	12/3/2020	PB SUBMITTAL
5	10/28/2020	PB SUBMITTAL
4	10/10/2020	REVISIONS
3	9/21/2020	TAC SUBMITTAL
2	8/17/2020	TAC SUBMITTAL
1	8/4/2020	TAC SUBMITTAL

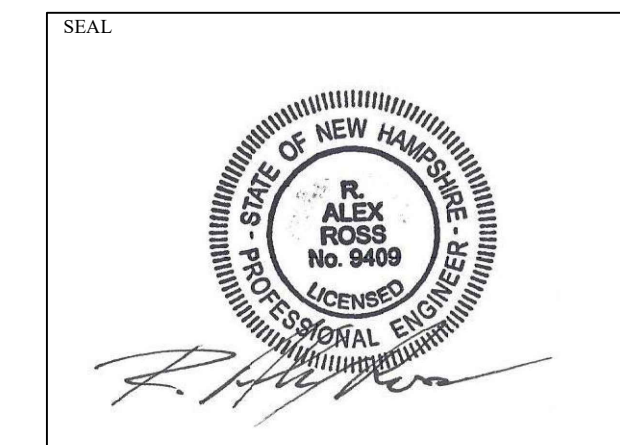
SCALE:	1" = 10'
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ROSS ENGINEERING, LLC
Civil/Structural Engineering & Surveying
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Portsmouth, NH 03801
(603) 433-7560

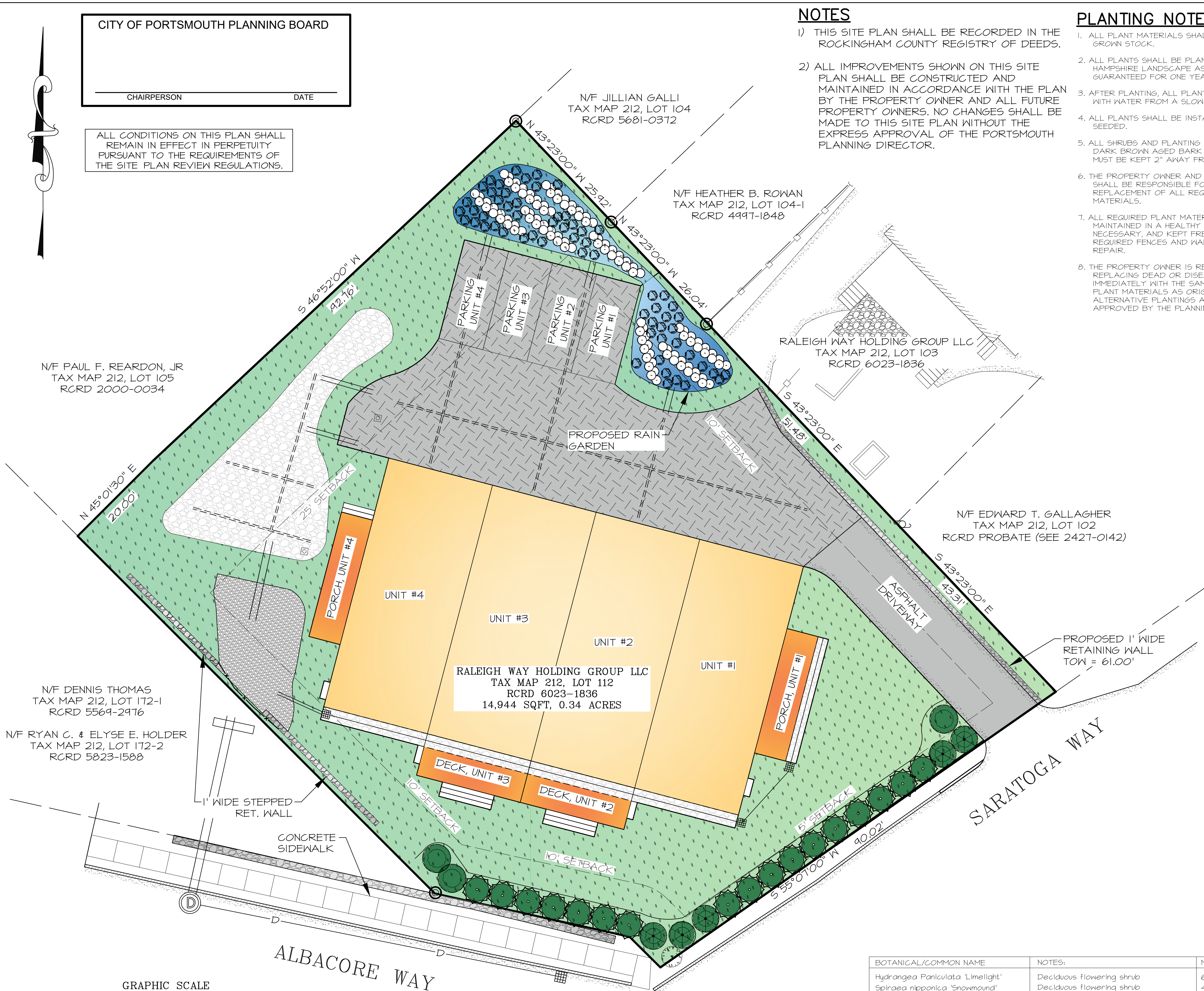
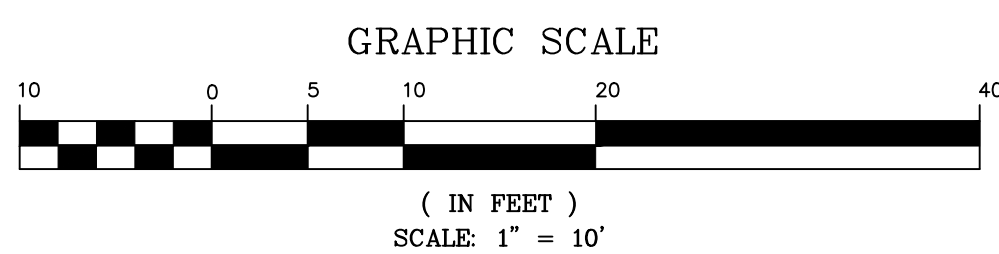
TITLE LANDSCAPE PLAN
for
SARATOGA WAY
Tax Map 212, Lots 112 & 113
Portsmouth, NH

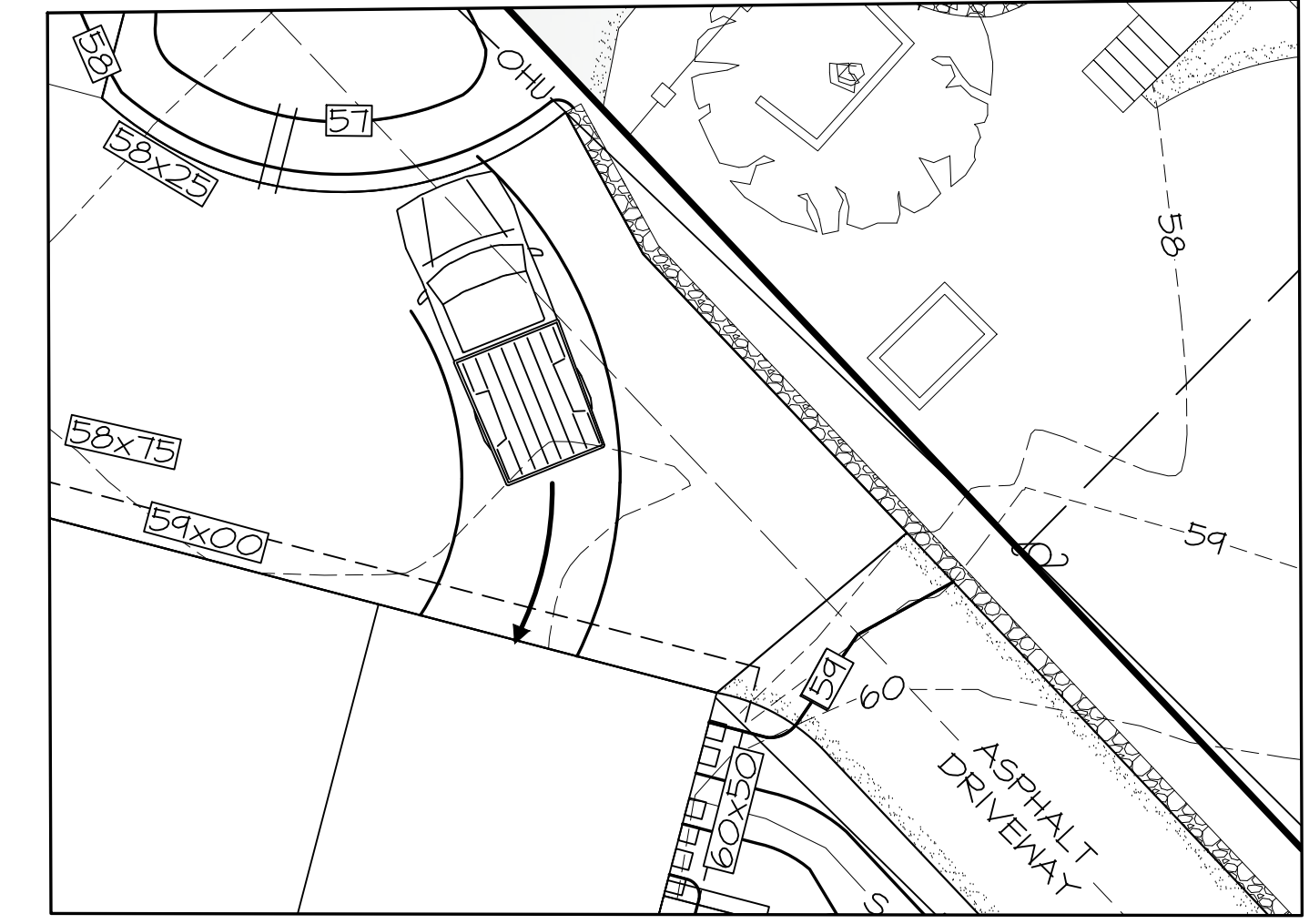
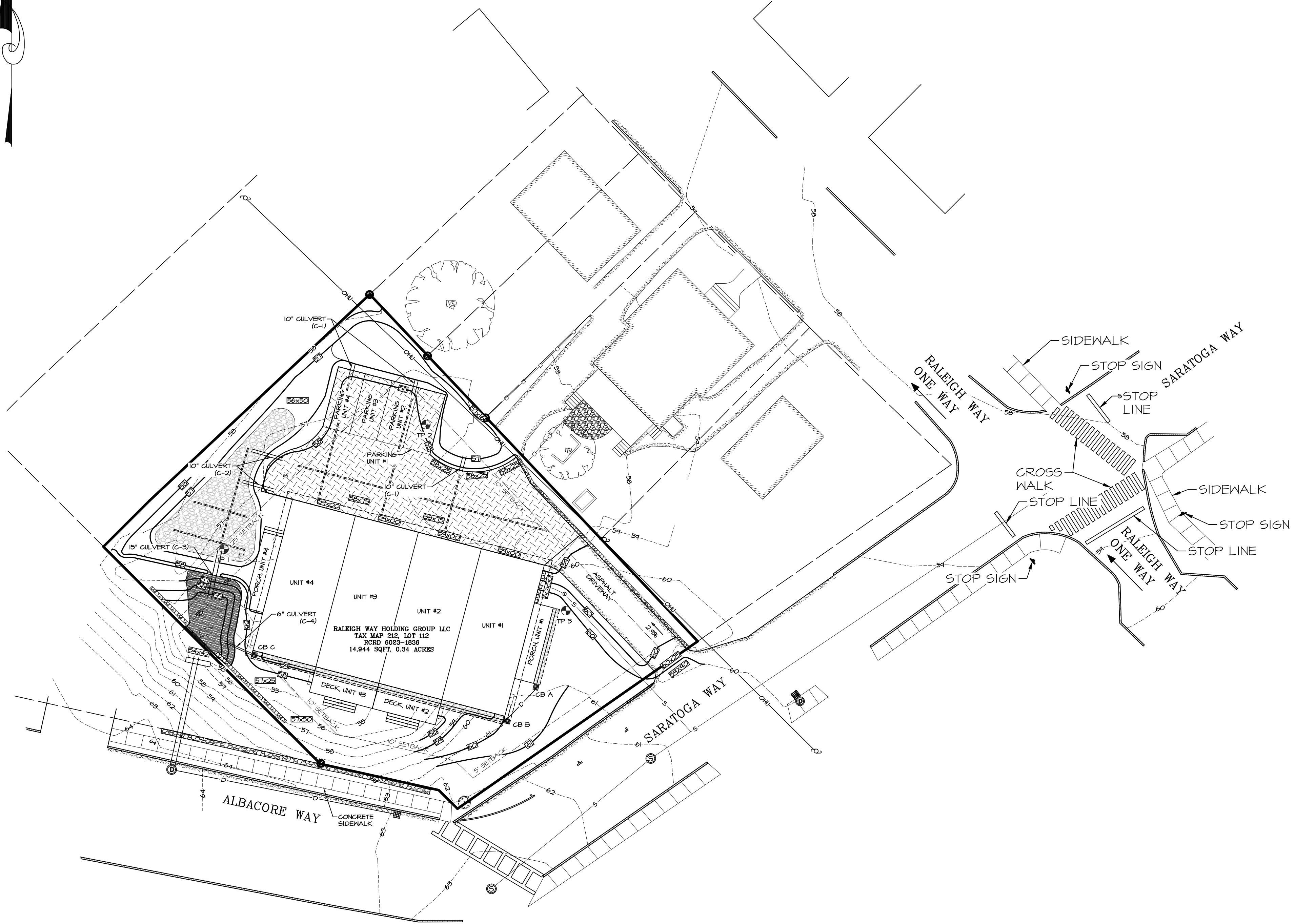
OWNER OF RECORD
Raleigh Way Holding Group, LLC
1 Middle Street, Suite 1
Portsmouth, NH 03801

JOB NUMBER	DWG. NO.	ISSUE
19-097	5 OF 10	7

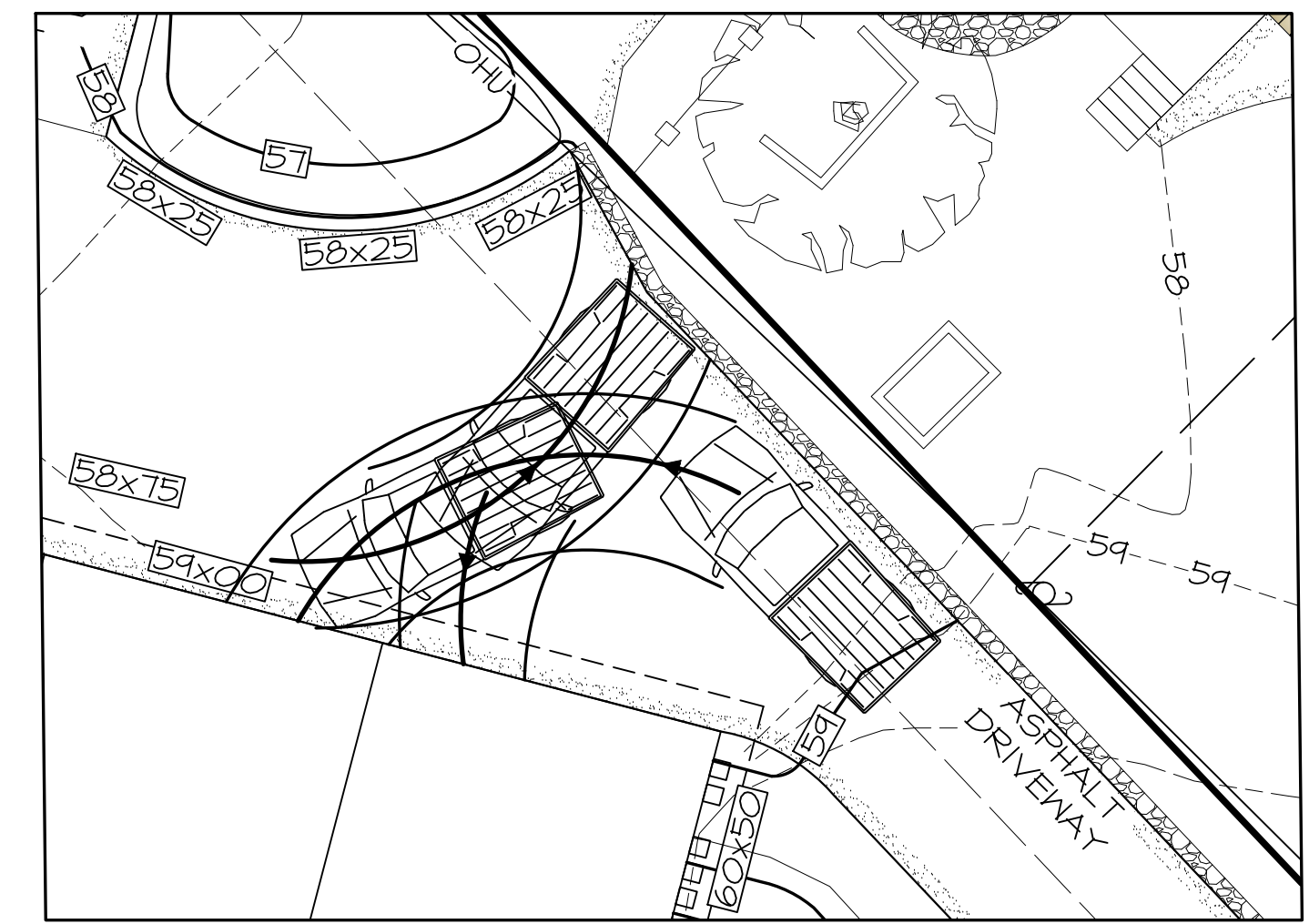


BOTANICAL/Common Name	NOTES:	MATURE SIZE	POT SIZE	QTY:
Hydrangea paniculata 'Limelight'	Deciduous flowering shrub	6'T x 6'W	6 G	5
Spiraea nipponica 'Snowmound'	Deciduous flowering shrub	4-5'T x 4-5'W	5 G	3
Thuja occidentalis 'Nigra': Arborvitae	Pyramidal evergreen hedging shrub	20-30'T-5-10'W	6-T' BB	17

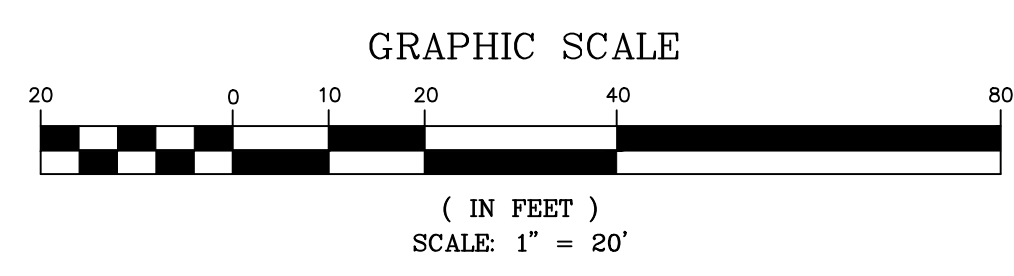




BACK IN



PULL IN



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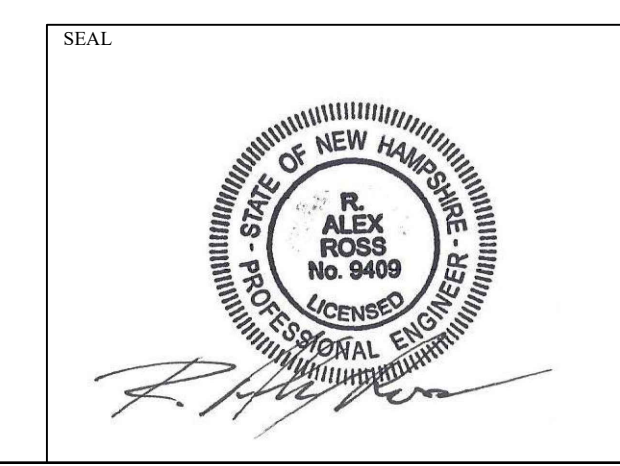
SCALE: 1" = 20'
CHECKED: A.ROSS
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& Surveying
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Portsmouth, NH 03801
(603) 433-7560

ROADWAY PLAN

for
SARATOGA WAY
Tax Map 212, Lots 112 & 113
Portsmouth, NH

OWNER OF RECORD
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1 Middle Street, Suite 1
Portsmouth, NH 03801

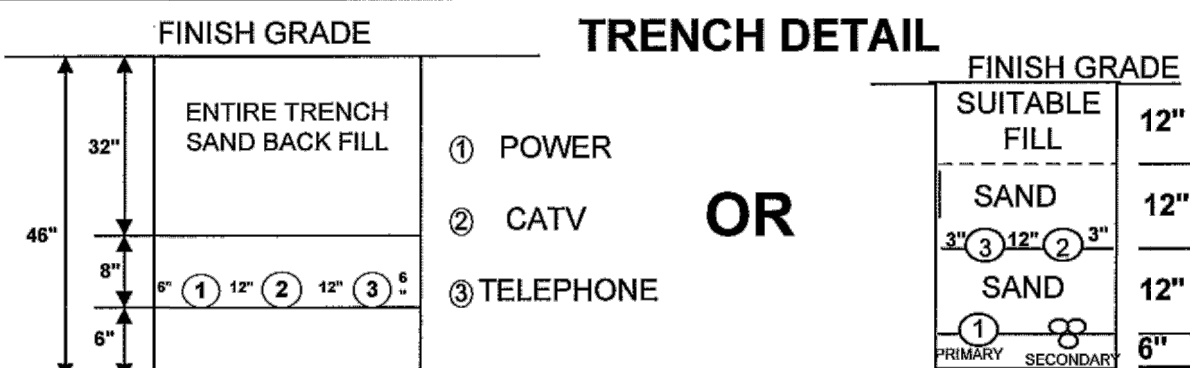




ENGINEER:
TELEPHONE:

CONDUIT SPECIFICATIONS

ANY DEVIATION FROM OUTLINED SPECIFICATIONS MUST BE AGREED TO IN ADVANCE BY VERIZON ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE CONDUIT THROUGH WHICH CABLE CAN BE SUCCESSFULLY PULLED. THE CONTRACTOR IS RESPONSIBLE FOR ALL EXPENSE ASSOCIATED WITH THE REPAIR OF CONDUIT THAT CANNOT BE USED BY VERIZON. VERIZON RESERVES THE RIGHT TO REQUIRE INSPECTION OF CONDUIT PRIOR TO BACK FILLING TO ENSURE COMPLIANCE.

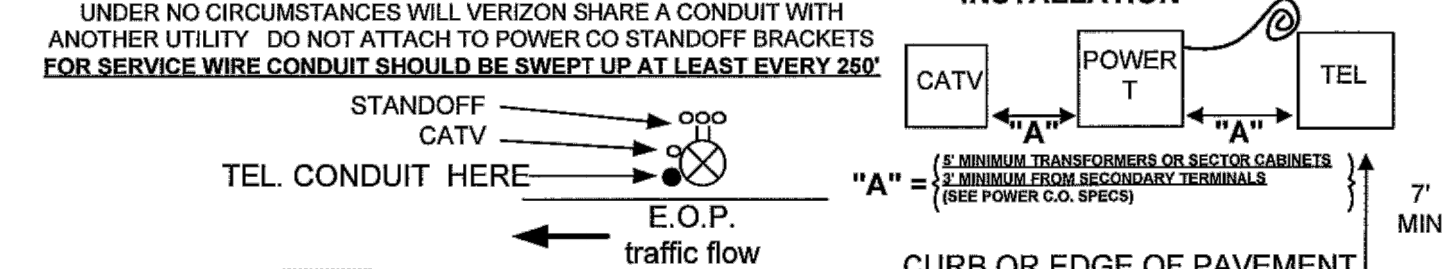


A - SAND BACK FILL SHALL CONSIST OF FINE GRANULAR MATERIAL 100% SHALL PASS THROUGH A 1/4\"/>

PERMITTED AS LONG AS THEIR TOTAL VOLUME PER CUBIC FOOT OF SAND DOES NOT EXCEED 1% C - THE SAND SHALL BE COMPLETELY FREE OF FROZEN LUMPS, ROCKS, STONES, DEBRIS OR RUBBISH

ALL CONDUIT SHALL BE GRAY NESC SCHEDULE 40 PVC OR EQUIVALENT (REQUIRES TEL ENGINEER APPROVAL)
4\"/>

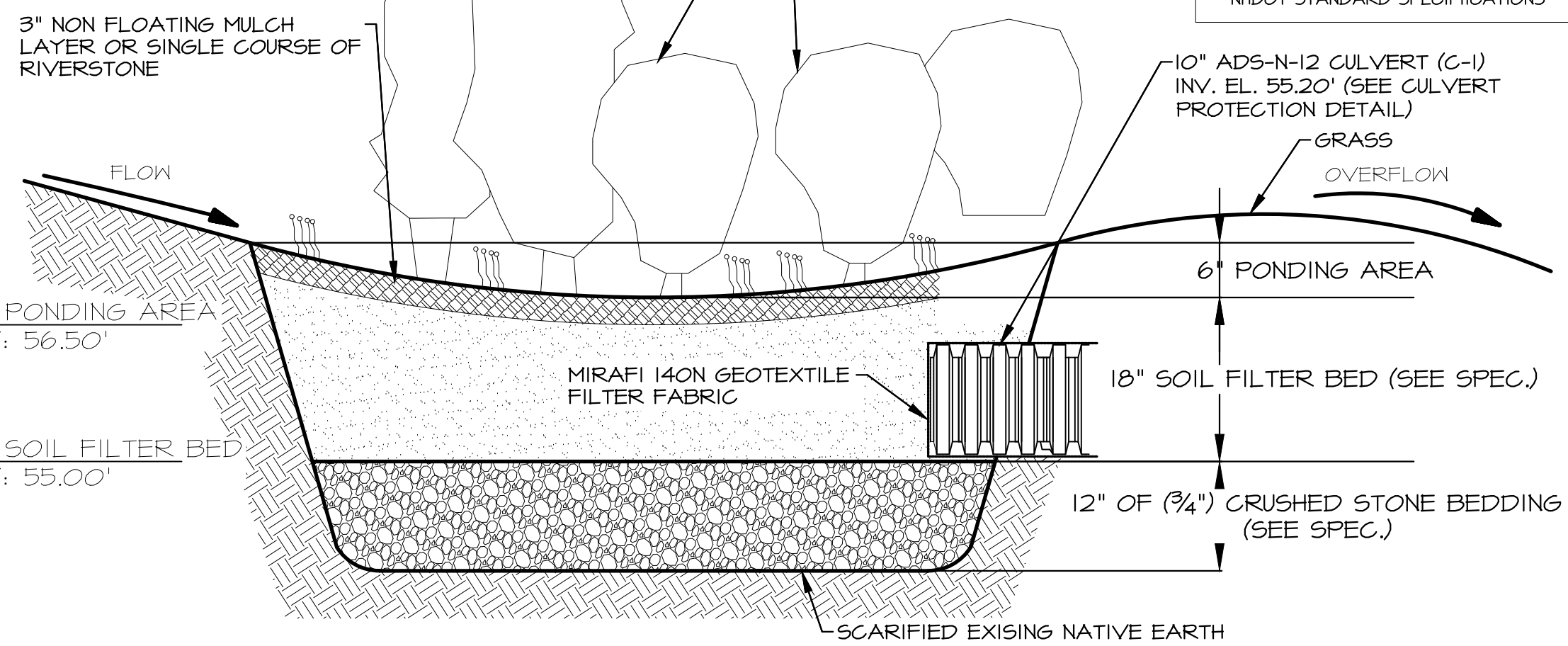
TYPICAL UTILITY INSTALLATION



ALL CONDUITS ARE TO BE SWEEPED UP HARD TOGETHER A MINIMUM OF 8\"/>

ALL CONDUITS MUST BE LABELED "TEL" WITH DIRECTION OF RUN INDICATED SO AS TO POSITIVELY IDENTIFY THEM FOR OUR PERSONNEL AND FURNISHED WITH A PULL STRING CAPABLE OF A 200 TO 300 POUND PULL

A #6 AWG COPPER GROUND WIRE SHALL BE CONNECTED TO THE POWER CO. TRANSFORMER / SECTOR CABINET GRID AT EACH TRANSFORMER / SECTOR CABINET LOCATION AND RUN FROM THERE TO THE TEL CONDUIT LEAVING A 3 FOOT COIL SECURED TO THE CONDUIT TO PREVENT ITS LOSS

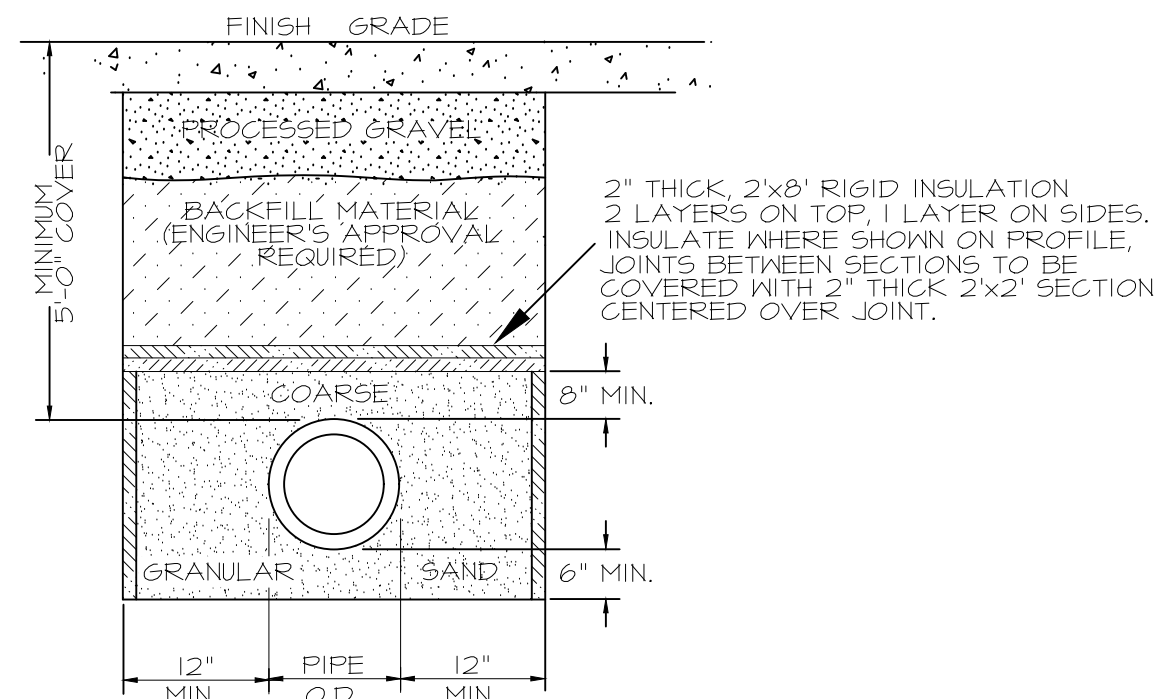


TYPICAL RAINGARDEN DETAIL

NOT TO SCALE

Component Material	Percent of Mixture by Volume	Gradation of Material	
		Sieve No.	Percent by Weight Passing Standard Sieve
Moderately fine shredded bark or wood fiber mulch, with fines as indicated	20 to 30	200	<5
	70 to 80	10	85 to 100
		20	10 to 100
Loamy coarse sand	70 to 80	60	15 to 40
		200	8 to 15

FILTER MEDIA SPECIFICATION

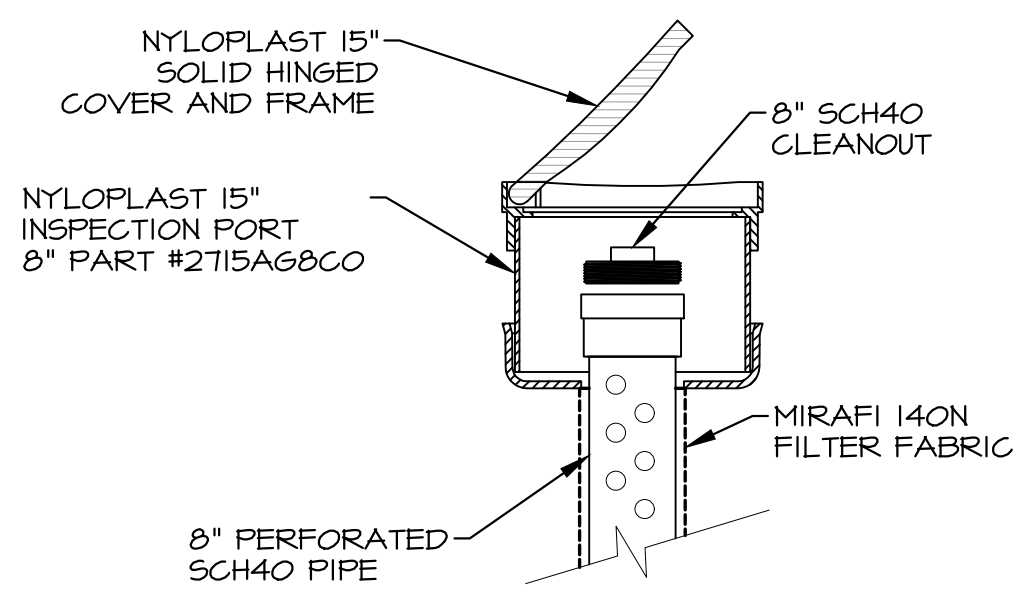


NOTE:

- SEE SITE PLAN FOR PIPE SIZES AND SERVICES.
- WATER PIPE TO BE DUCTILE IRON (DI) CLASS 52.
- CONTRACTOR TO REVIEW ALL UTILITIES WITH PORTSMOUTH DPW.

Waterline Installation

N.T.S.

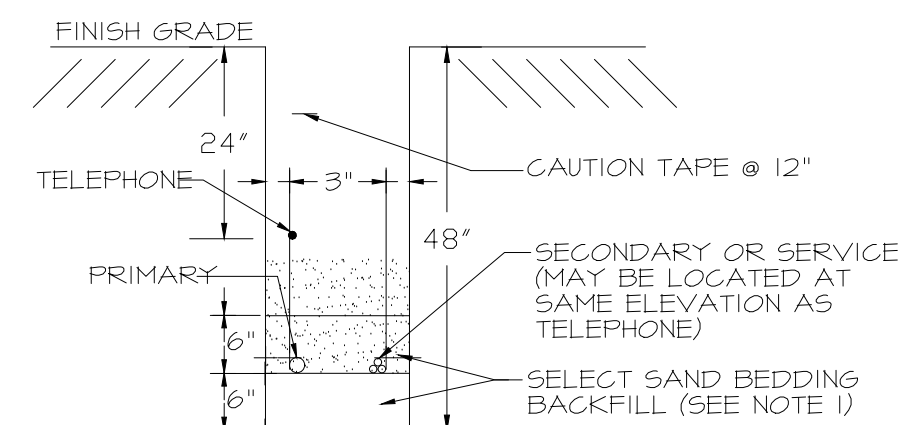


INSPECTION PORT DETAIL

N.T.S.

CRUSHED STONE BEDDING *	SIEVE SIZE	% PASSING BY WEIGHT
	1"	100
	3/4"	90 - 100
	3/8"	20 - 55
	#4	0 - 10
	#8	0 - 5

* EQUIVALENT TO STANDARD STONE SIZE #67 - SECTION 103 OF NHDOT NHDOT STANDARD SPECIFICATIONS

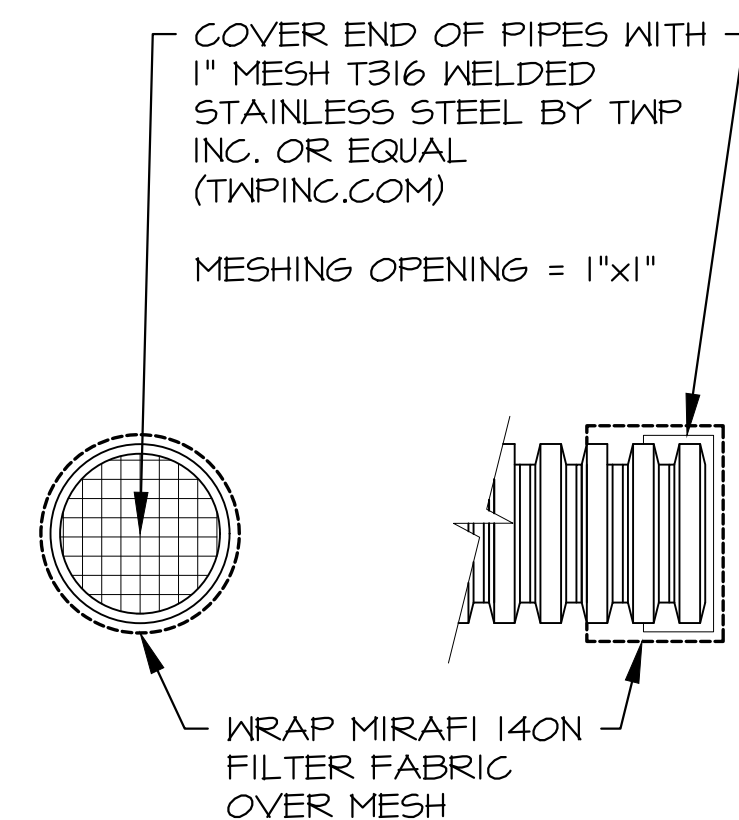


NOTES:

- SELECTED SAND BACKFILL--100% SHALL PASS THROUGH 1/4\"/>
- TRENCH WIDTH IS TO BE 12\"/>
- UNDERGROUND UTILITY CABLES ARE TO BE FIELD RUN AND COORDINATED WITH APPLICABLE UTILITY COMPANIES.
- PRIMARY SERVICE IS BE NO LESS THAN 3\"/>

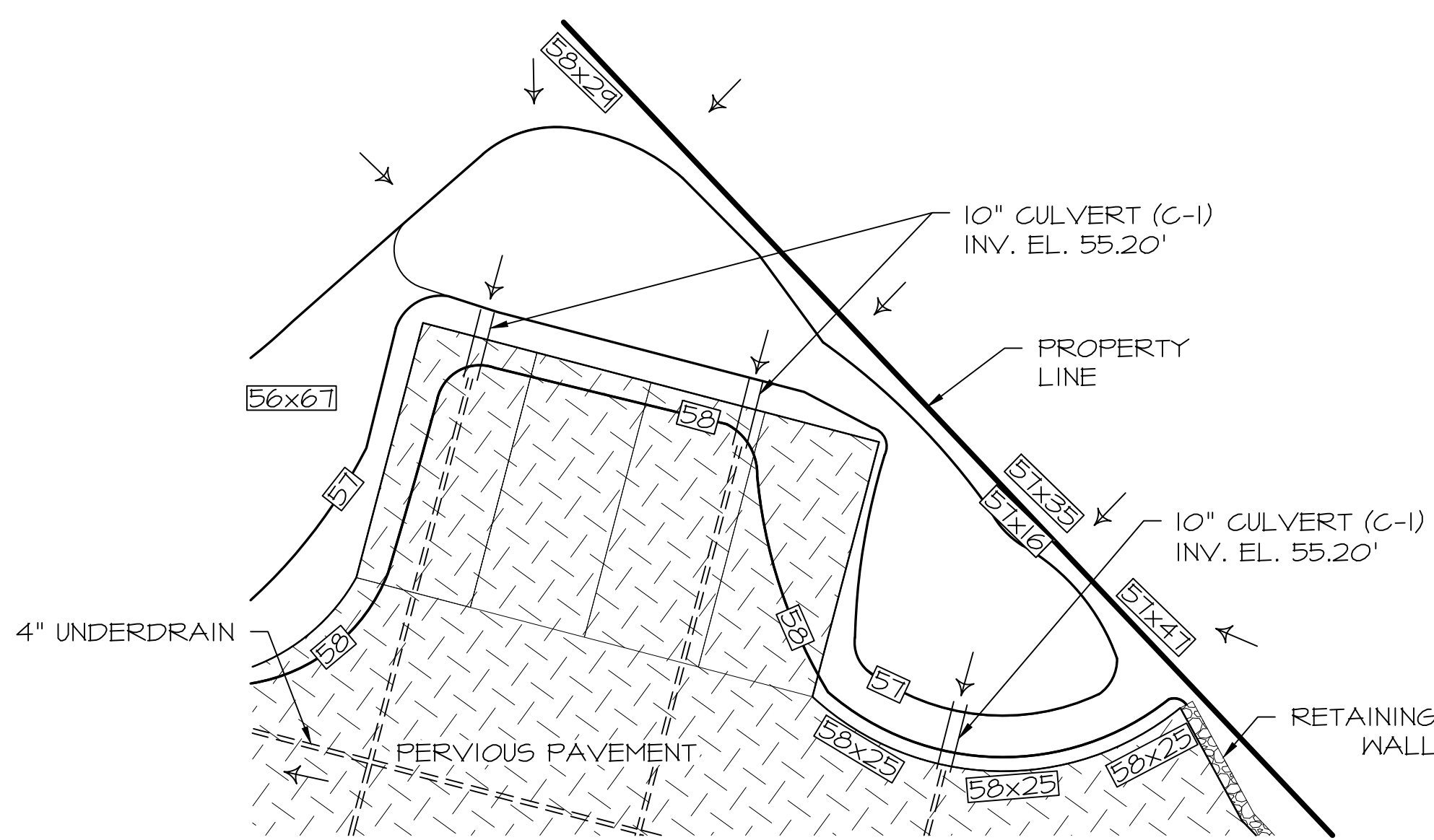
Utility Cable Installation

N.T.S.



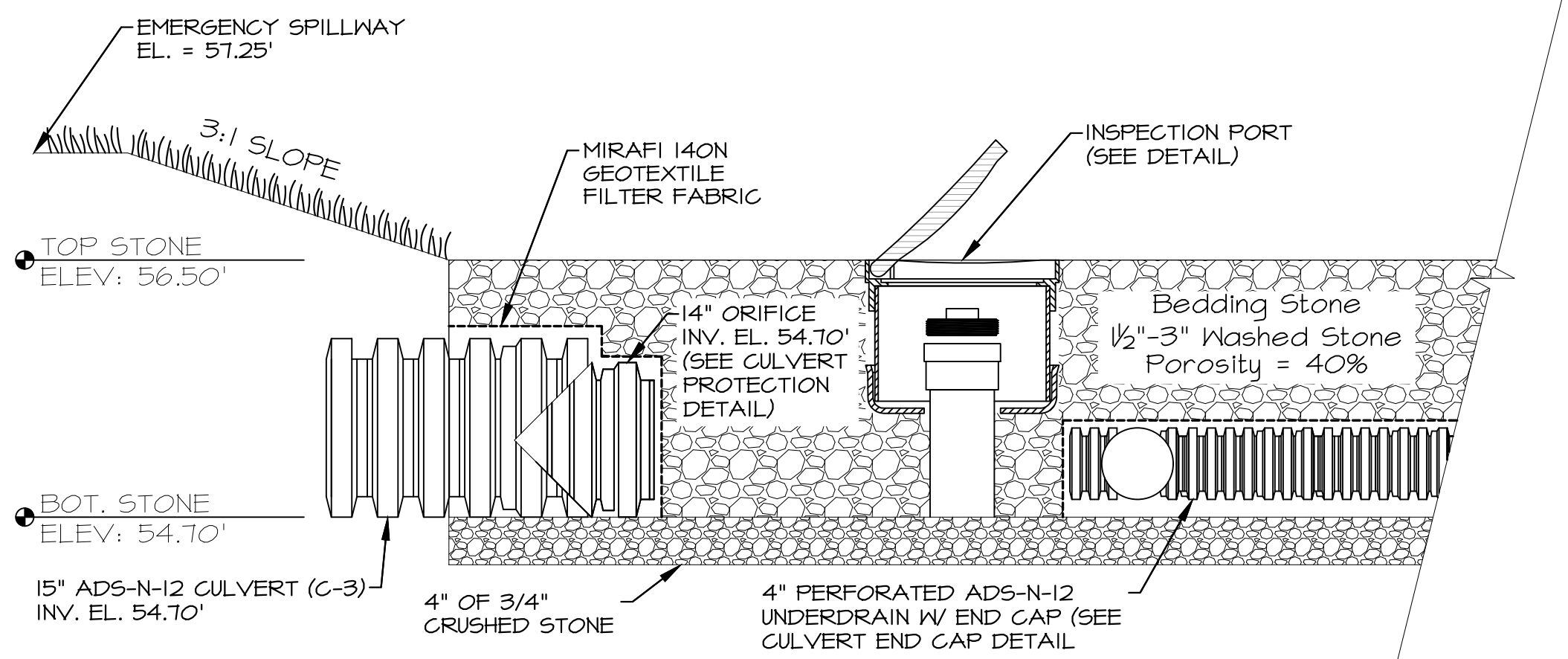
CULVERT PROTECTION DETAIL

N.T.S.



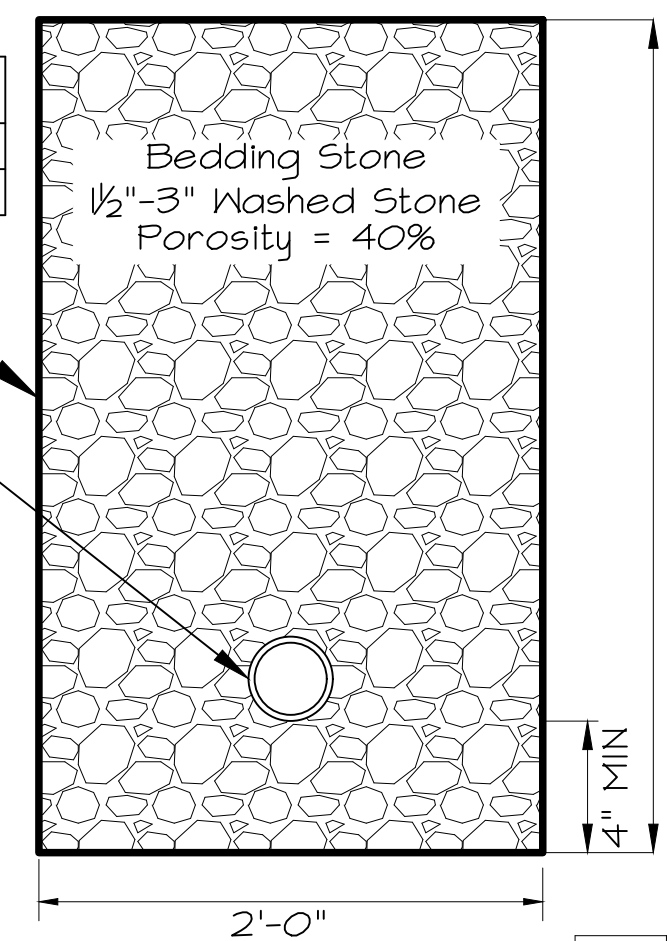
RAIN GARDEN PLAN VIEW

Scale: 1" = 10'



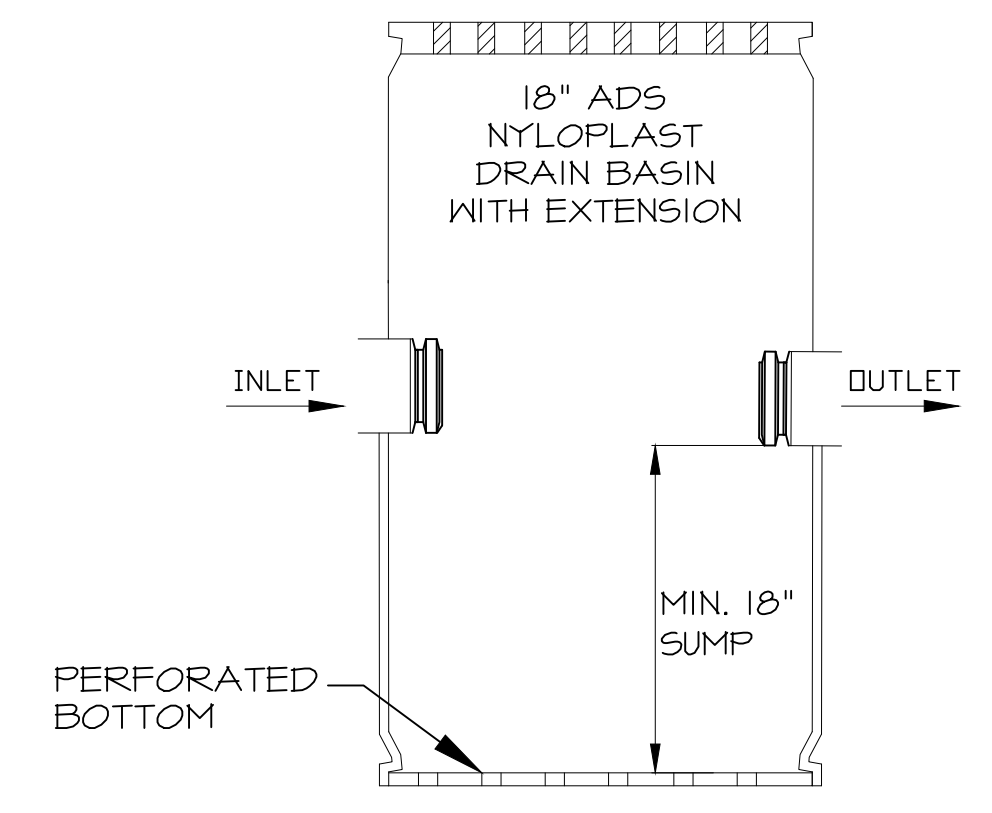
STONE DETENTION POND

Scale : N.T.S



INFILTRATION TRENCH DETAIL

N.T.S.



TYP. CATCH BASIN

N.T.S.

#	DESCRIPTION	TYPE	INLET	OUTLET	LENGTH
C-1	CULVERT FROM RAIN GARDEN	10" ADS N-12	55.20'	55.15'	5.00'
C-2	CULVERT FROM PERVIOUS PAVEMENT	10" ADS N-12	55.00'	54.85'	10.00'
C-3	CULVERT FROM STONE DET. POND	15" ADS N-12	54.70'	54.50'	15.00'
C-4	CULVERT FROM CB C	6" ADS N-12	55.90'	55.70'	9.00'

PROPOSED CULVERT DESCRIPTION

N.T.S.

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7	1/7/2021	PB SUBMITTAL
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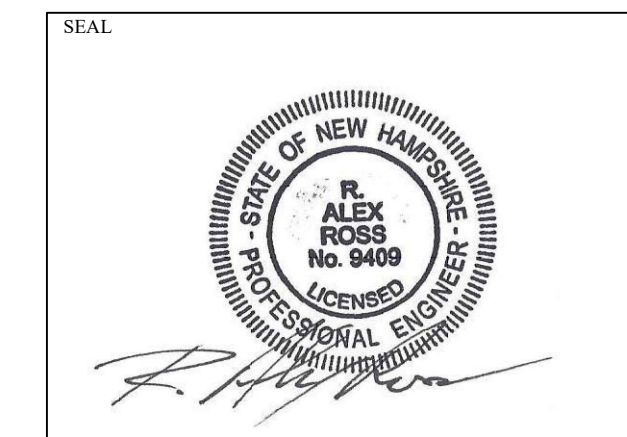
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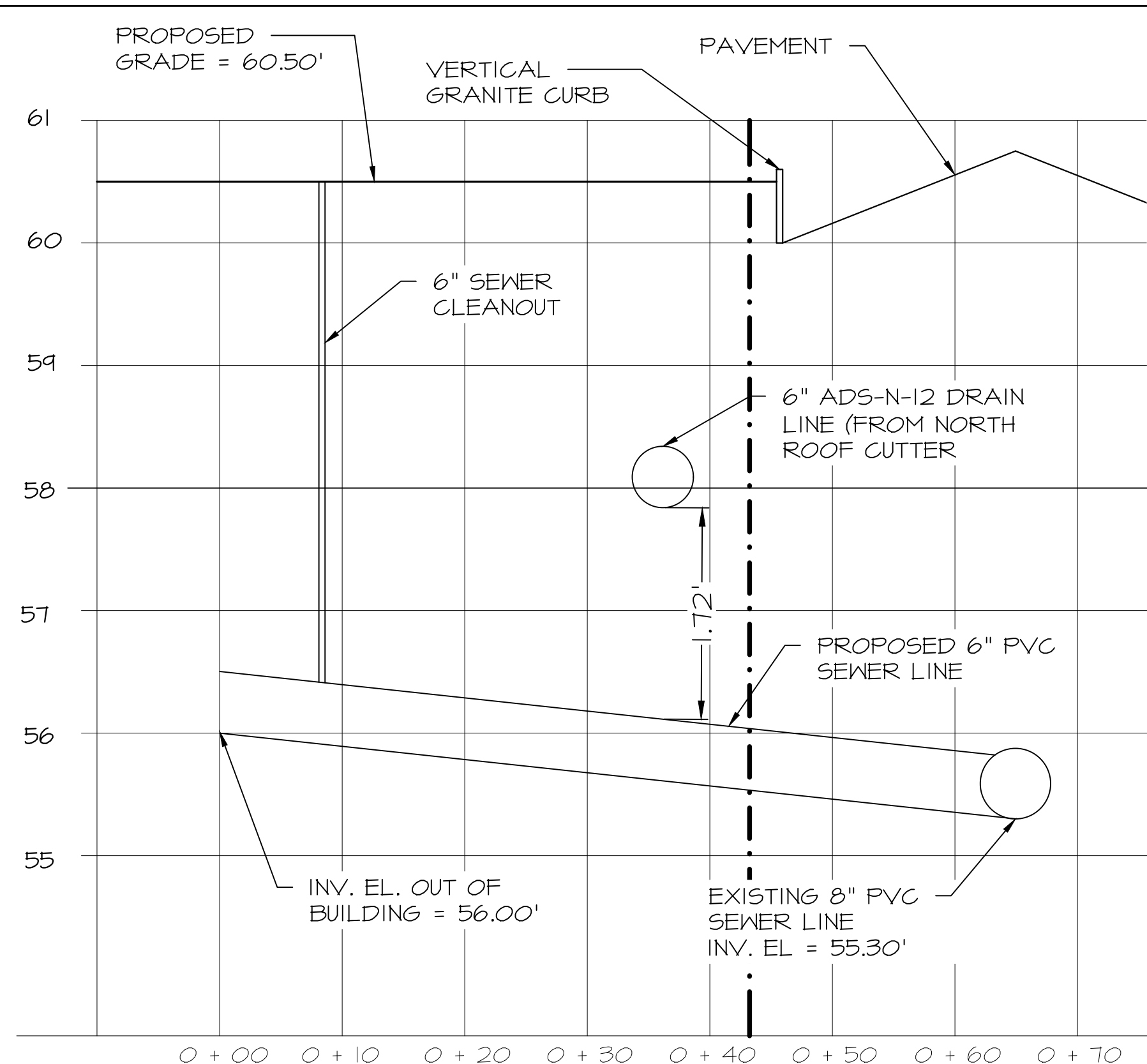
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CHECKED: A.ROSS

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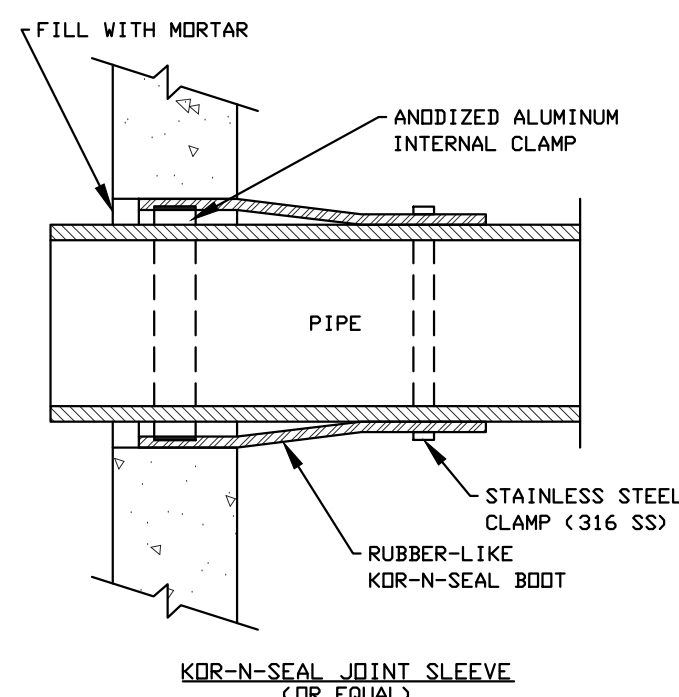
JOB NUMBER	DWG. NO.	ISSUE
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SEWER PROFILE

SCALE: HORIZONTAL: 1" = 10'
VERTICAL: 1" = 1'



MANHOLE PENETRATIONS

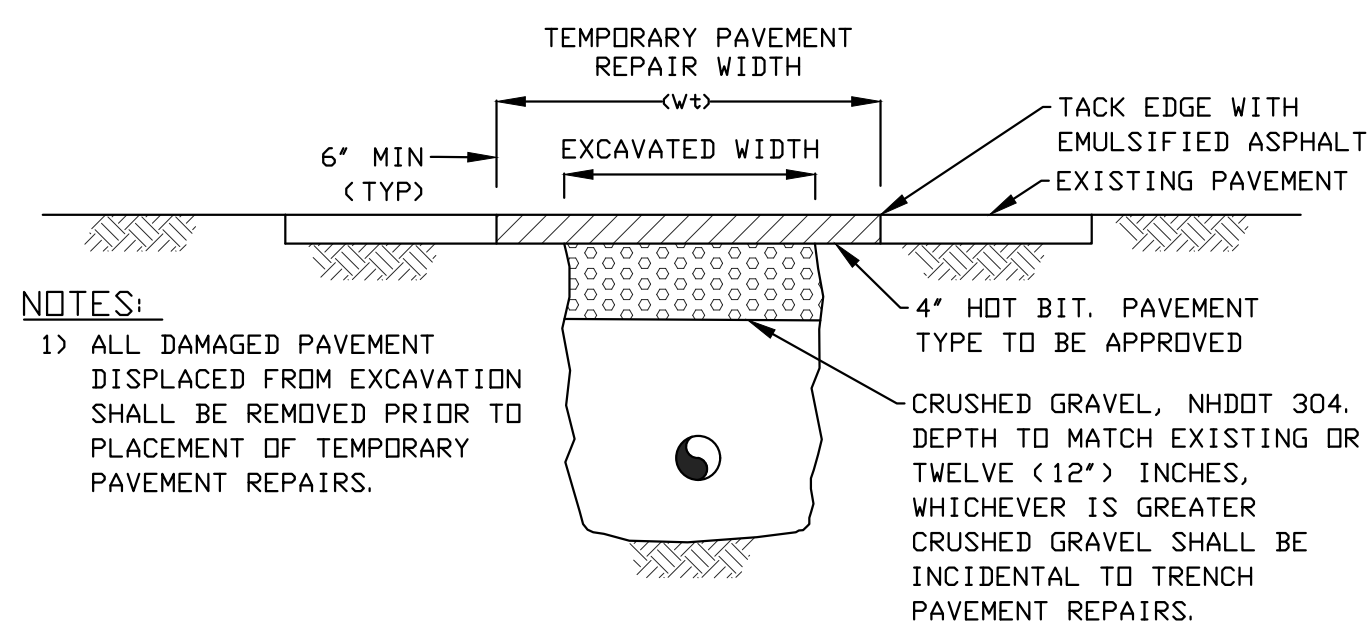
Scale: N.T.S.

PAVEMENT REPAIR NOTE:

THE DIMENSIONS SHOWN SHALL BE CONSIDERED MINIMUM PAVEMENT PAYMENT WIDTHS FOR 0-10' DEEP CONSTRUCTION. W_t AND W_p SHALL BE INCREASED BY 4' - 0" FOR TRENCHES 10' TO 15' AND BY 8' - 0" FOR TRENCHES 15' TO 20' IN DEPTH.

MINIMUM TRENCH PAVEMENT WIDTHS

PIPE I. D.	W_t (INCHES)	W_p (INCHES)
1-21 INCHES	72	108
24-30 INCHES	84	120
> 30 INCHES	96	132



NOTES:

1) ALL DAMAGED PAVEMENT DISPLACED FROM EXCAVATION SHALL BE REMOVED PRIOR TO PLACEMENT OF TEMPORARY PAVEMENT REPAIRS.

4" HOT BIT. PAVEMENT TYPE TO BE APPROVED
CRUSHED GRAVEL, NHDOT 304. DEPTH TO MATCH EXISTING OR TWELVE (12") INCHES, WHICHEVER IS GREATER CRUSHED GRAVEL SHALL BE INCIDENTAL TO TRENCH PAVEMENT REPAIRS.

TEMPORARY TRENCH PAVEMENT REPAIR

Scale: N.T.S.

WATER SYSTEM NOTES:

- ALL WATER SERVICES SHALL BE AT LEAST 1" COPPER UNLESS THE EXISTING SERVICE IS LARGER.
- NO WORK SHALL BE PERFORMED ON PRIVATE PROPERTY UNTIL THE OWNER HAS SIGNED A MEMORANDUM OF UNDERSTANDING WITH THE CITY.
- THE CONTRACTOR SHALL PHASE THE CONSTRUCTION OF THE WATER TO MINIMIZE DISRUPTION TO THE EXISTING SYSTEM. THE SYSTEM SHALL NOT BE IMPACTED OR SHUT DOWN WITHOUT PROPER NOTICE AND ANY DAMAGE CAUSED BY A SHUTDOWN WILL BE PAID FOR BY THE CONTRACTOR. MAINTENANCE OF THE WATER FLOW IS SUBSIDIARY TO THE WORK.
- WATER SHUT DOWN NOTICES SHALL BE 3 WEEK DAYS IN ADVANCE OF THE SHUTDOWN.
- THE WATER MAINS SHALL BE CONSTRUCTED OF 8" CEMENT LINED DUCTILE IRON EXCEPT FOR TIE LINES AND HYDRANT STUBS.
- WATER SERVICE CURB STOPS SHALL BE SET 1/4" OF AN INCH BELOW GRADE IN THE SIDEWALK SURFACE IF POSSIBLE.
- ALL EXISTING PIPES ABANDONED IN PLACE SHALL BE PLUGGED AT ALL OPEN AREAS.
- THE SYSTEM WILL BE TESTED FOR LEAKS, CONTAMINANTS.
- NATION AND FLAWS PRIOR TO ACCEPTANCE BY THE CITY.
- ALL GATE VALVES SHALL BE RESTRAINED WITH MECHANICAL RESTRAINT JOINTS AND REINFORCED WITH THRUST BLOCKING.
- ALL TEES, BENDS GATES AND CAPS SHALL BE USED WITH MECHANICAL RESTRAINT JOINTS AND REINFORCED WITH THRUST BLOCKING.
- ALL TEES, BENDS GATES AND CAPS SHALL BE USED WITH MECHANICAL RESTRAINT JOINTS AND REINFORCED WITH THRUST BLOCKING.
- MAINTAIN A MINIMUM DISTANCE OF 10' BETWEEN THE SEWER AND THE WATER SYSTEM EXCEPT FOR CROSSINGS WHICH SHALL BE CONSTRUCTED PER THE CURRENT STATE APPROVED RULES.
- ALL PORTIONS OF THE NEW DUCTILE IRON WATER MAIN SYSTEM SHALL BE PROTECTED USING PLASTIC WRAPPINGS AND BRASS CONDUCTIVITY WEDGES. SEE SPECIFICATIONS.

GENERAL NOTES:

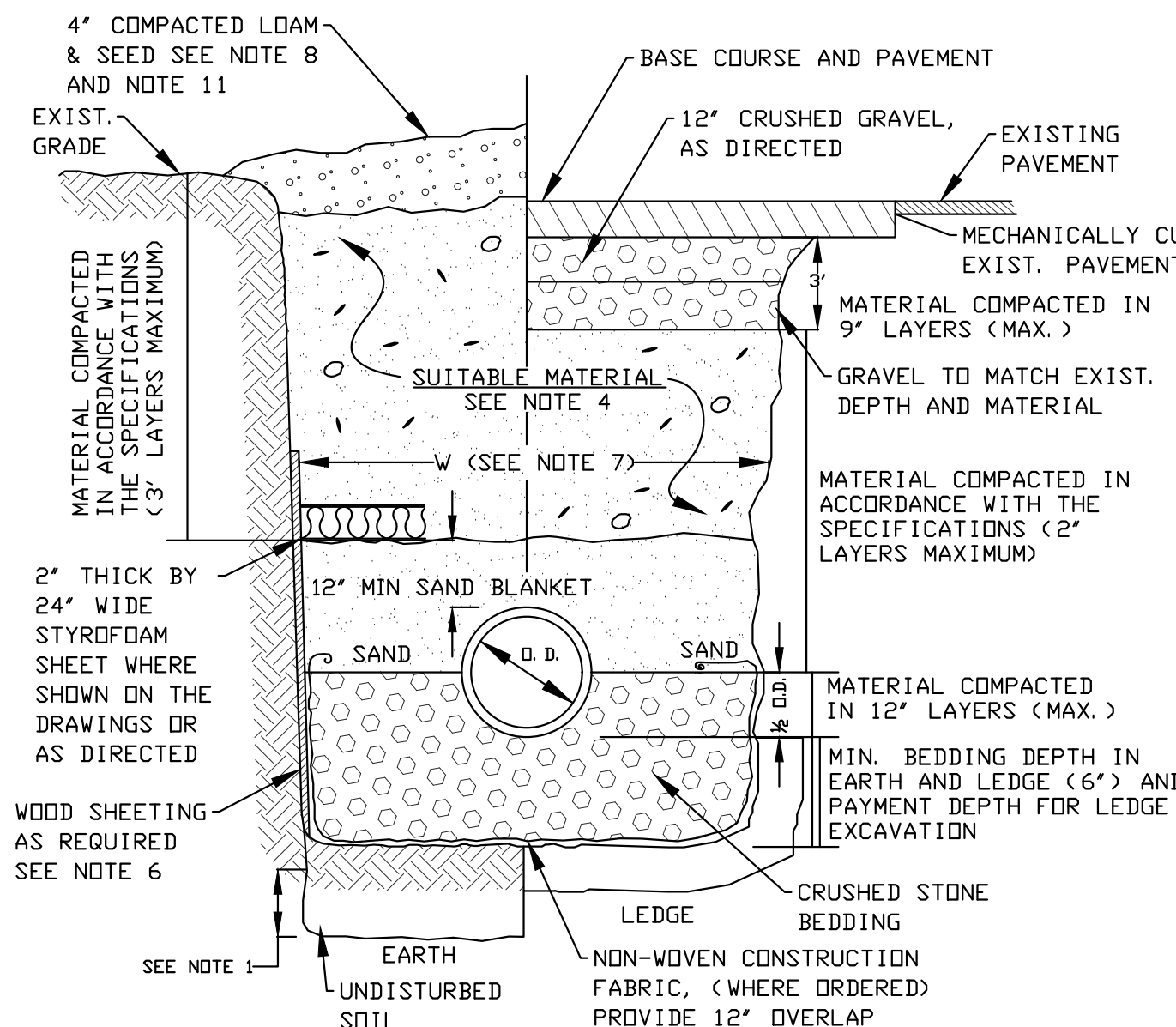
- ADD FITTINGS AS NECESSARY TO ENSURE THAT VALVES ARE INSTALLED NEARLY LEVEL.
- THIS PLAN IS BASED ON A FIELD SURVEY PERFORMED BY RDSS ENGINEERING. EXISTING UTILITIES THAT ARE SHOWN ON THE PLANS WERE GATHERED FROM AVAILABLE STRUCTURES THAT WERE VIABLE, RECORD DRAWINGS OF THE VARIOUS UTILITY COMPANIES CAMERA INSPECTIONS AND OBSERVATIONS MADE. THERE IS NO GUARANTEE THAT THE UTILITIES SHOWN ARE EXACTLY AS PORTRAYED OF THAT OTHER UTILITIES THAT ARE NOT SHOWN DON'T EXIST. ALL THE STRUCTURES SHOWN HAVE MULTIPLE SERVICES AND MAY HAVE OLD CONNECTIONS THAT MAY HAVE NOT BEEN PROPERLY ABANDONED. THE BIDDER SHOULD ASSUME THAT EXTREME CAUTION AND HAND EXCAVATION MAY BE REQUIRED IN THESE OLDER PORTIONS OF THE CITY. NO EXTRA PAYMENTS WILL BE MADE FOR EXPLORATION OF DEFUNCT UTILITIES LEFT IN THE GROUND.
 - THE CONTRACTOR IS RESPONSIBLE FOR THE LOCATION, PROTECTION AND REPAIR (IF DAMAGED) OF THE EXISTING UTILITY INFRASTRUCTURE WITHIN THE BOUNDS OF THE PROJECT ONCE CONSTRUCTION HAS BEGUN. NOTIFY DIG SAFE AT LEAST 72 HOURS PRIOR TO THE BEGINNING OF EXCAVATION WORK. CONTRACTOR SHALL IMMEDIATELY NOTIFY ENGINEER OF CONFLICTS BETWEEN THE EXISTING AND PROPOSED UTILITIES.
 - ALL CONFLICTS WITH GAS LINES SHALL BE COORDINATED WITH UNITIL, THE GAS COMPANY, AND SHALL BE SUBSIDIARY. THE GAS COMPANY WAS NOTIFIED OF OBVIOUS CONFLICTS PREVIOUSLY AND WAS TO LOCATE THEIR MAINS AND SERVICES IN ACCORDANCE TO THE PROPOSED LAYOUT ON THIS PLAN. THE CITY MAKES NO GUARANTEES THAT THE ACTUAL AS BUILT LOCATIONS OF THE GAS LINES ARE AS SHOWN ON THESE PLANS.
 - THE CONTRACTOR SHALL MAINTAIN ONE PASSABLE LANE AND SAFE PASSAGE FOR RESIDENTS TO AND FROM THEIR BUSINESS AND DWELLINGS IN THE NEIGHBORHOOD. WORK THAT REQUIRES THE COMPLETE SHUT DOWN OF THE STREET HAS TO BE APPROVED BY THE ENGINEER PRIOR TO THE WORK COMMENCING.
 - THE STREETS IN THE PROJECT AREA WILL BE PASSABLE AND SAFE IN THE OPINION OF THE ENGINEER PRIOR TO WORK TERMINATING AT THE END OF THE DAY.
 - THE USE OF STEEL PLATES IN LIEU OF BACKFILLING WILL NOT BE ALLOWED UNLESS APPROVED BY THE DIRECTOR OF PUBLIC WORKS AHEAD OF TIME.
 - THESE PLANS HAVE BEEN CREATED TO BE USED TOGETHER WITH THE CONTRACT AND SPECIFICATIONS TO CREATE ONE COMPLETE BID AND CONSTRUCTION DOCUMENT.
 - THE CONTRACTOR SHALL PROVIDE SUBMITTALS FOR ALL MATERIALS TO BE USED ON THIS PROJECT. THE CONTRACTOR SHALL NOT PURCHASE ANY MATERIALS UNTIL THEY HAVE BEEN APPROVED FOR USE BY THE DEPARTMENT.
 - THE CONTRACTOR WILL BE RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OF ALL SURPLUS EARTHEN MATERIALS, PIPE, UNUSED CURBING, LEDGE, OLD OR UNUSED SEWER AND DRAINAGE STRUCTURES ETC.
 - THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL PROPERTY RESTORATION BOTH PUBLIC AND PRIVATE FOR DAMAGE DONE BY THE CONTRACTOR. RESTORATION WILL BE COMPLETED WITH NOT COST TO THE CITY.
 - TEMPORARY OR PERMANENT PAVING WILL BE RESTORED TO EXISTING LINE AND GRADE UNLESS DIRECTED BY THE ENGINEER.
 - OVERHEAD WIRES ARE SHOWN ON THE DRAWINGS BUT THE CITY MAKES NO WARRANTY TO THEIR COMPLETENESS OR THAT THEIR HEIGHT IS SUFFICIENT TO COMPLETE THE WORK. POLES THAT NEED TO BE HELD UP BY THE UTILITY COMPANY WILL BE PAID FOR BY THE CONTRACTOR WITH NO ADDITIONAL COST PASSED ON TO THE CITY.
 - THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND REINSTALLATION OF TRAFFIC AND CONSTRUCTION SIGNS AS NEEDED TO ACCOMPLISH THE WORK. CITY SIGNS (STOP, NO PARKING, ONE WAY, ETC) NEED TO BE REINSTALLED AT THE END OF EACH WORKDAY.
 - ALL WORK BEING DONE IN THE CITY RIGHT-OF-WAY SHALL BE REVIEWED BY THE CITY AND INSPECTED BY THE CITY AS IT IS BEING DONE.

GRAVITY SEWER TRENCH NOTES:

- ORDERED EXCAVATION OF UNSUITABLE MATERIAL BELOW GRADE:** BACKFILL AS STATED IN THE TECHNICAL SPECIFICATIONS OR AS SHOWN ON THE DRAWINGS.
- BEDDING:** SEE NOTE 7 OF STANDARD MANHOLE NOTES. WHERE ORDERED BY THE ENGINEER TO STABILIZE THE TRENCH BASE, GRADED SCREENED GRAVEL OR CRUSHED STONE 1/2 INCH TO 1-1/2 INCH SHALL BE USED.
- SAND BLANKET:** CLEAN SAND FREE FROM ORGANIC MATTER, SO GRADED THAT 90-100% PASSES A 1/2 INCH SIEVE AND NOT MORE THAN 15% WILL PASS A #200 SIEVE. NO STONE LARGER THAN 2" SHOULD BE IN CONTACT WITH THE PIPE.
- SUITABLE MATERIAL:** IN ROADS, ROAD SHOULDERS, WALKWAYS AND TRAVELED WAYS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE DEBRIS; PIECES OF PAVEMENT; ORGANIC MATTER; TOP SOIL; ALL WET OR SOFT MUCK, PEAT, OR CLAY; ALL EXCAVATED LEDGE MATERIAL; ALL ROCKS OVER 6 INCHES IN LARGEST DIMENSION; AND ANY MATERIAL WHICH, AS DETERMINED BY THE ENGINEER, WILL NOT PROVIDE SUFFICIENT SUPPORT OR MAINTAIN THE COMPLETED CONSTRUCTION IN A STABLE CONDITION. IN CROSS-COUNTRY CONSTRUCTION, SUITABLE MATERIAL SHALL BE AS DESCRIBED ABOVE, EXCEPT THAT THE ENGINEER MAY PERMIT THE USE OF TOP SOIL, LOAM, MUCK, OR PEAT, IF HE IS SATISFIED THAT THE COMPLETED CONSTRUCTION WILL BE ENTIRELY STABLE AND PROVIDED THAT EASY ACCESS TO THE SEWER FOR MAINTENANCE AND POSSIBLY RECONSTRUCTION, WILL BE PRESERVED.
- BASE COURSE AND PAVEMENT:** SHALL MEET THE REQUIREMENTS OF THE NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION'S LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES - DIVISIONS 300 AND 400 RESPECTIVELY AND LOCAL REGULATION.
- WOOD SHEATHING, IF REQUIRED:** WHERE SHEATHING IS PLACED ALONGSIDE THE PIPE AND EXTENDS BELOW MID-DIAMETER, IT SHALL BE CUT OFF AND LEFT IN PLACE TO AN ELEVATION 1 FOOT ABOVE THE TOP OF PIPE. WHERE SHEATHING IS ORDERED BY THE ENGINEER TO BE LEFT IN PLACE, IT SHALL BE CUT OFF AT LEAST 3 FEET BELOW FINISHED GRADE, BUT NOT LESS THAN 1 FOOT ABOVE THE TOP OF THE PIPE.
- W = MAXIMUM ALLOWABLE TRENCH PAYMENT WIDTH** FOR LEDGE EXCAVATION AND FOR ORDERED EXCAVATION BELOW GRADE. FOR PIPES 15 INCHES NOMINAL DIAMETER OR LESS, W SHALL BE NO MORE THAN 36 INCHES. FOR PIPES GREATER THAN 12 INCHES IN NOMINAL DIAMETER, W SHALL BE 24 INCHES PLUS PIPE OUTSIDE DIAMETER (O. D.). ALSO, W SHALL BE THE PAYMENT WIDTH.
- FOR CROSS COUNTRY CONSTRUCTION,** BACKFILL OR FILL SHALL BE MOUNDED TO A HEIGHT OF 6 INCHES ABOVE THE ORIGINAL GROUND SURFACE.
- CONCRETE FOR ENCASEMENT** SHALL CONFORM TO THE REQUIREMENTS OF SECTION 520, (NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION).
- CONCRETE FULL ENCASEMENT:** IF FULL ENCASEMENT IS UTILIZED, DEPTH OF CONCRETE BELOW PIPE SHALL BE 1/4 I. D. (4' MINIMUM). BLOCK SUPPORT SHALL BE SOLID CONCRETE BLOCKS.
- GRAVEL DRIVEWAY AND SHOULDER RESTORATION:** CRUSHED GRAVEL IN DRIVEWAYS AND ROAD SHOULDERS SHALL MATCH EXISTING WITH A MINIMUM OF 12". GRAVEL REPLACEMENT SHALL BE SUBSIDIARY TO SEWER CONSTRUCTION AND WILL NOT BE MEASURED FOR PAYMENT.

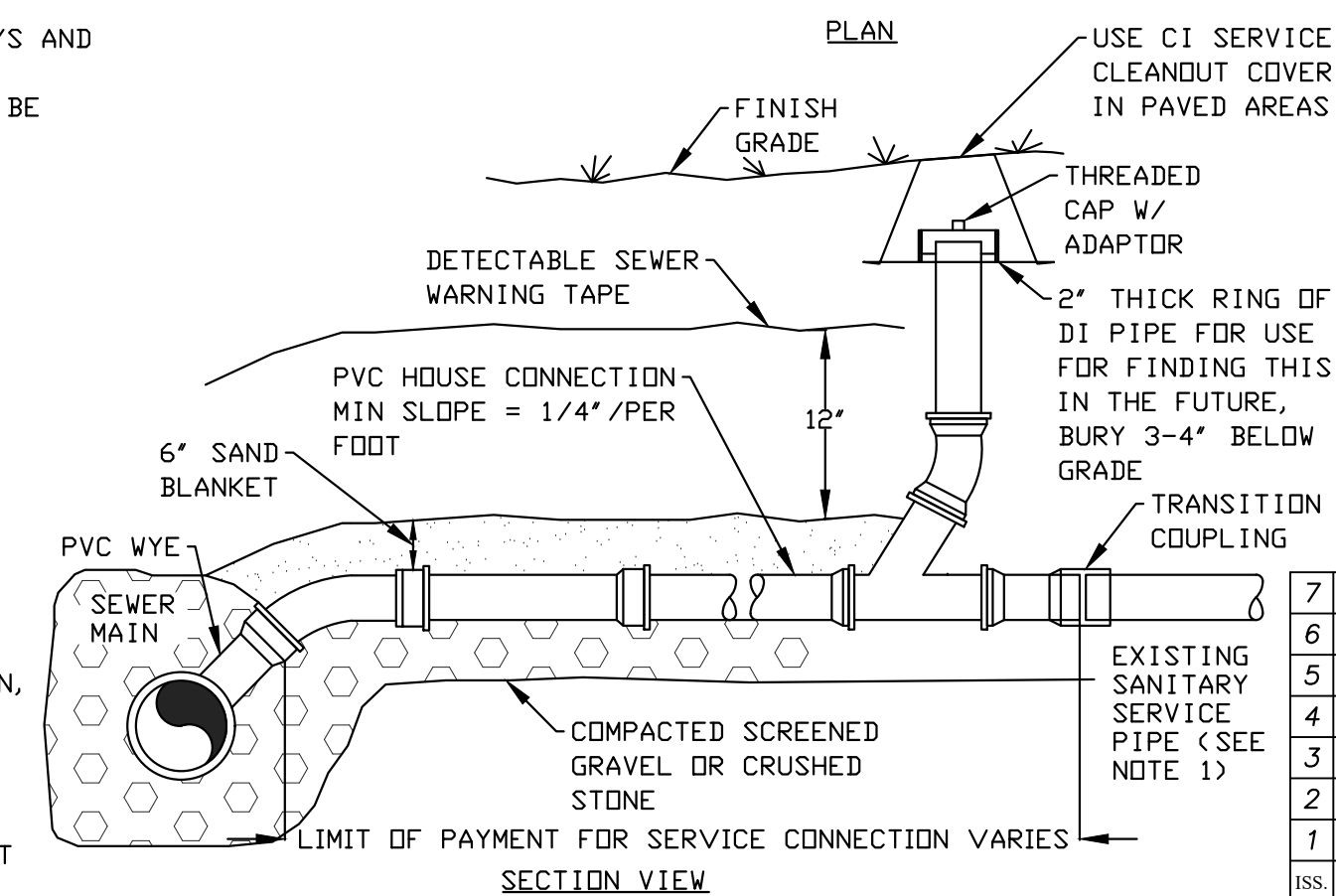
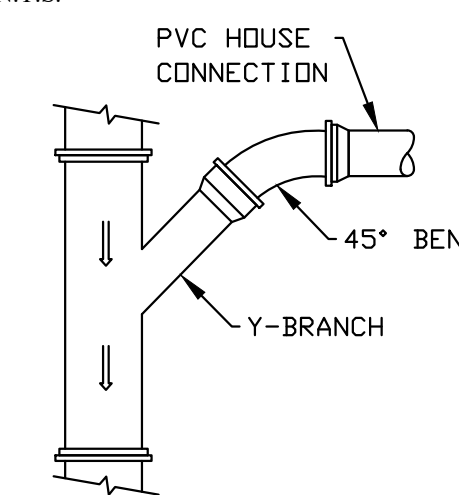
NOTES:

- ALL SEWER SERVICE EXTENSIONS SHALL BE 6', CONTRACTOR SHALL VERIFY EXISTING SEWER SERVICE LOCATION AND ELEVATION BY EXCAVATION OF TEST PITS OR OTHER MEANS PRIOR TO THE CONSTRUCTION OF SEWER MAIN.
- SERVICE CONNECTION SHALL BE INSTALLED BELOW WATER MAIN WHERE POSSIBLE.
- VARIOUS SIZE TRANSITION COUPLINGS SHALL BE STORED ON SITE FOR CONNECTION TO EXISTING SERVICES.
- CLEANOUTS SHALL BE INSTALLED AT EACH LIVE SEWER SERVICE CONNECTION, AS SHOWN ON THIS PLAN. REBAR SHALL BE PLACED AT SIDE OF CLEANOUT.
- CLEANOUT SHALL BE USED TO PLUG AND TEST ALL NEW LATERALS WITH MINIMAL INTERRUPTION TO OPERATION OF HOMEOWNER SANITARY SYSTEM. CLEANOUTS SHALL BE INCIDENTAL TO SERVICE CONNECTIONS AND SHALL NOT BE CONSIDERED FOR PAYMENT.



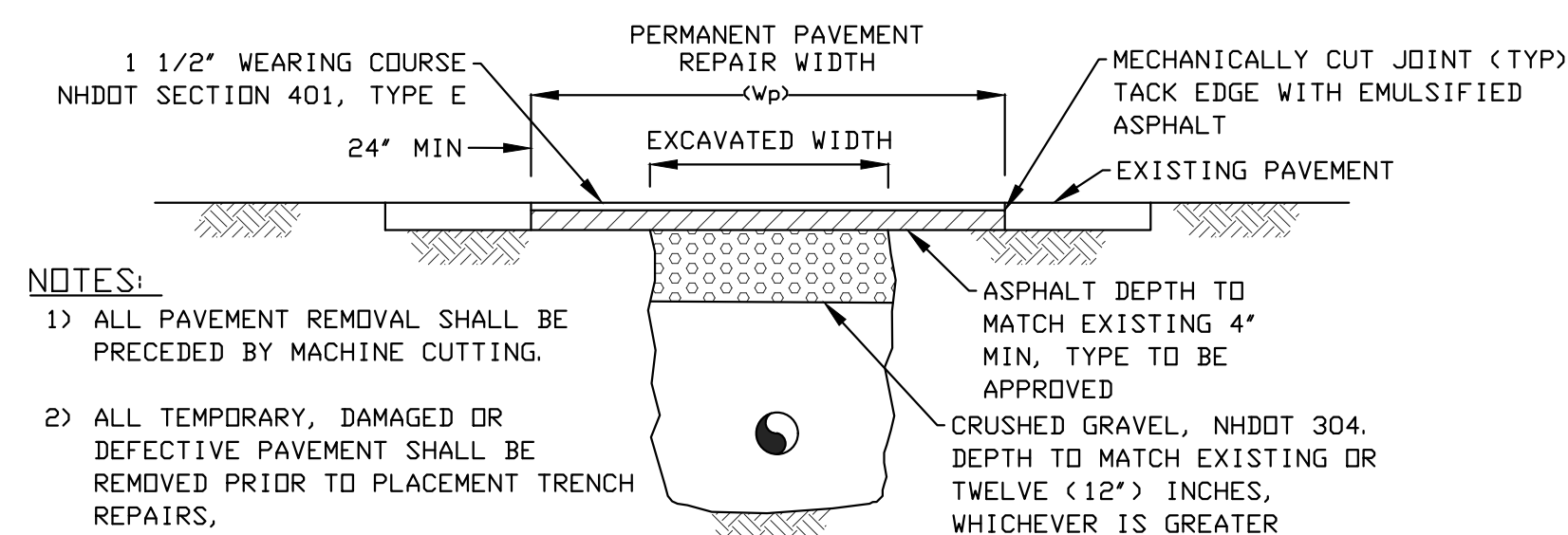
TRENCH DETAIL- GRAVITY SEWER

Scale: N.T.S.



TYPICAL SERVICE CONNECTION

Scale: N.T.S.



NOTES:

- ALL PAVEMENT REMOVAL SHALL BE PRECEDED BY MACHINE CUTTING.
- ALL TEMPORARY, DAMAGED OR DEFECTIVE PAVEMENT SHALL BE REMOVED PRIOR TO PLACEMENT TRENCH REPAIRS.
- DIAMOND PATCHES, SHALL BE REQUIRED FOR ALL TRENCHES CROSSING ROADWAY. DIAMOND PATCHES SHALL MEET NHDOT REQUIREMENTS.

PERMANENT TRENCH PAVEMENT REPAIR

ISS.	DATE	DESCRIPTION OF ISSUE
7	1/7/2021	PB SUBMITTAL
6	12/3/2020	PB SUBMITTAL
5	10/28/2020	PB SUBMITTAL
4	10/10/2020	REVISIONS
3	9/21/2020	TAC SUBMITTAL
2	8/17/2020	TAC SUBMITTAL
1	8/4/2020	TAC SUBMITTAL

SCALE: 1" = 10'

CHECKED: A.ROSS

DRAWN: DDD

CHECKED: A.ROSS

ROSS ENGINEERING, LLC

Civil/Structural Engineering & Surveying
909 Islington St.
Portsmouth, NH 03801
(603) 433-7560

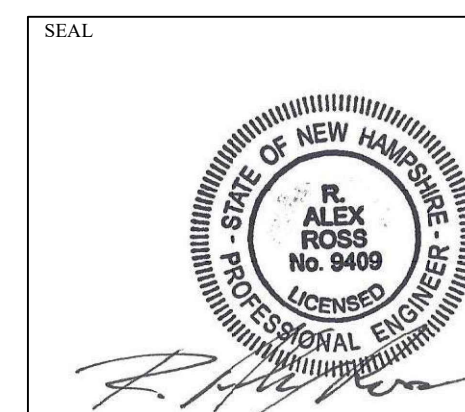
TITLE

NOTES
for
SARATOGA WAY
Tax Map 212, Lots 112 & 113
Portsmouth, NH

OWNER OF RECORD
Raleigh Way Holding Group, LLC
1 Middle Street, Suite 1
Portsmouth, NH 03801

JOB NUMBER DWG. NO. ISSUE

19-097 10 OF 10 7





PROPOSED VIEW
FROM SARATOGA WAY

RIDGE HEIGHT
EL = 32'7"

ATTIC FLOOR
EL = 19'9 3/4"

2ND FLOOR
EL = 9'10 7/8"

1ST FLOOR
EL = 0'0"



WEST ELEVATION 1/8" = 1'0"

RIDGE HEIGHT
EL = 32'7"

ATTIC FLOOR
EL = 19'9 3/4"

2ND FLOOR
EL = 9'10 7/8"

1ST FLOOR
EL = 0'0"



EAST ELEVATION 1/8" = 1'0"

PROPOSED BUILDING AT TITLE: PROP WEST & EAST ELEV

SARATOGA WAY SCALE: 1/8" = 1'0"
PORTSMOUTH, NH DATE: 9.10.2020

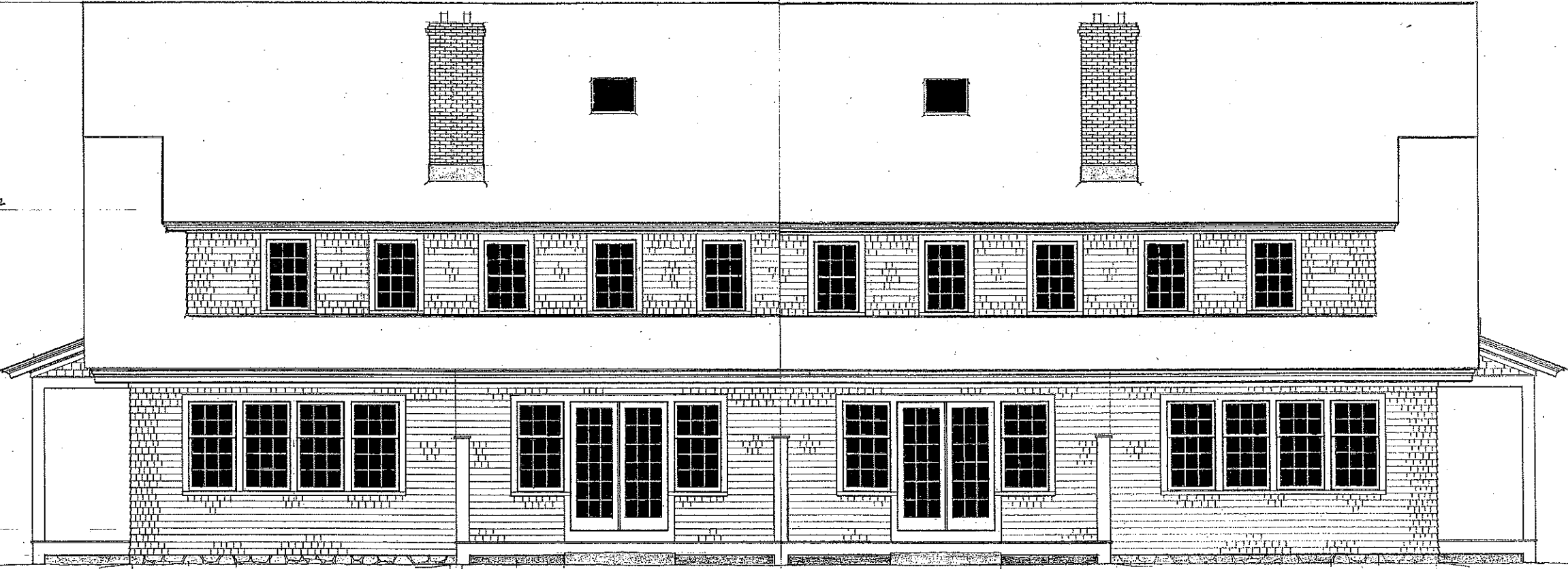
REVISIONS:

TOP OF RIDGE
EL = 32'7"

ATTIC FLOOR
EL = 19'9 3/4"

2ND FLOOR
EL = 9'10 7/8"

1ST FLOOR
EL = 0'0"



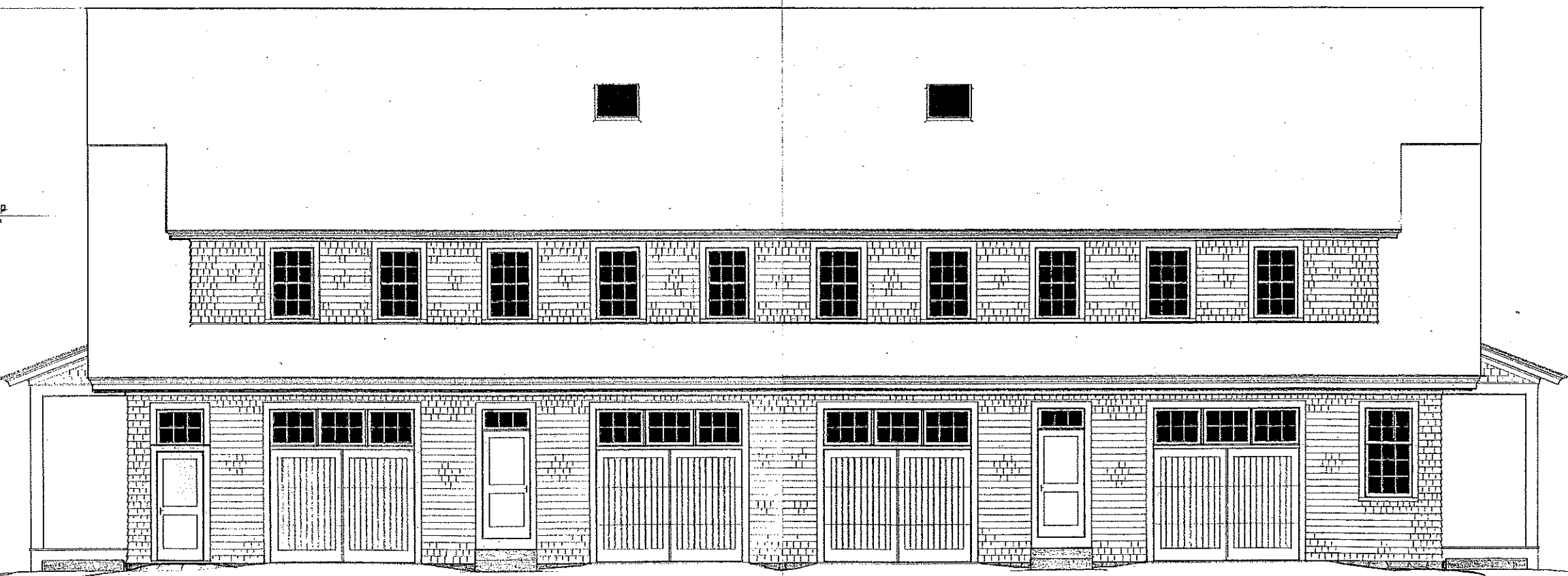
SOUTH ELEVATION 1/8" = 1'0"

TOP OF RIDGE
EL = 32'7"

ATTIC FLOOR
EL = 19'9 3/4"

2ND FLOOR
EL = 9'10 7/8"

1ST FLOOR
EL = 0'0"

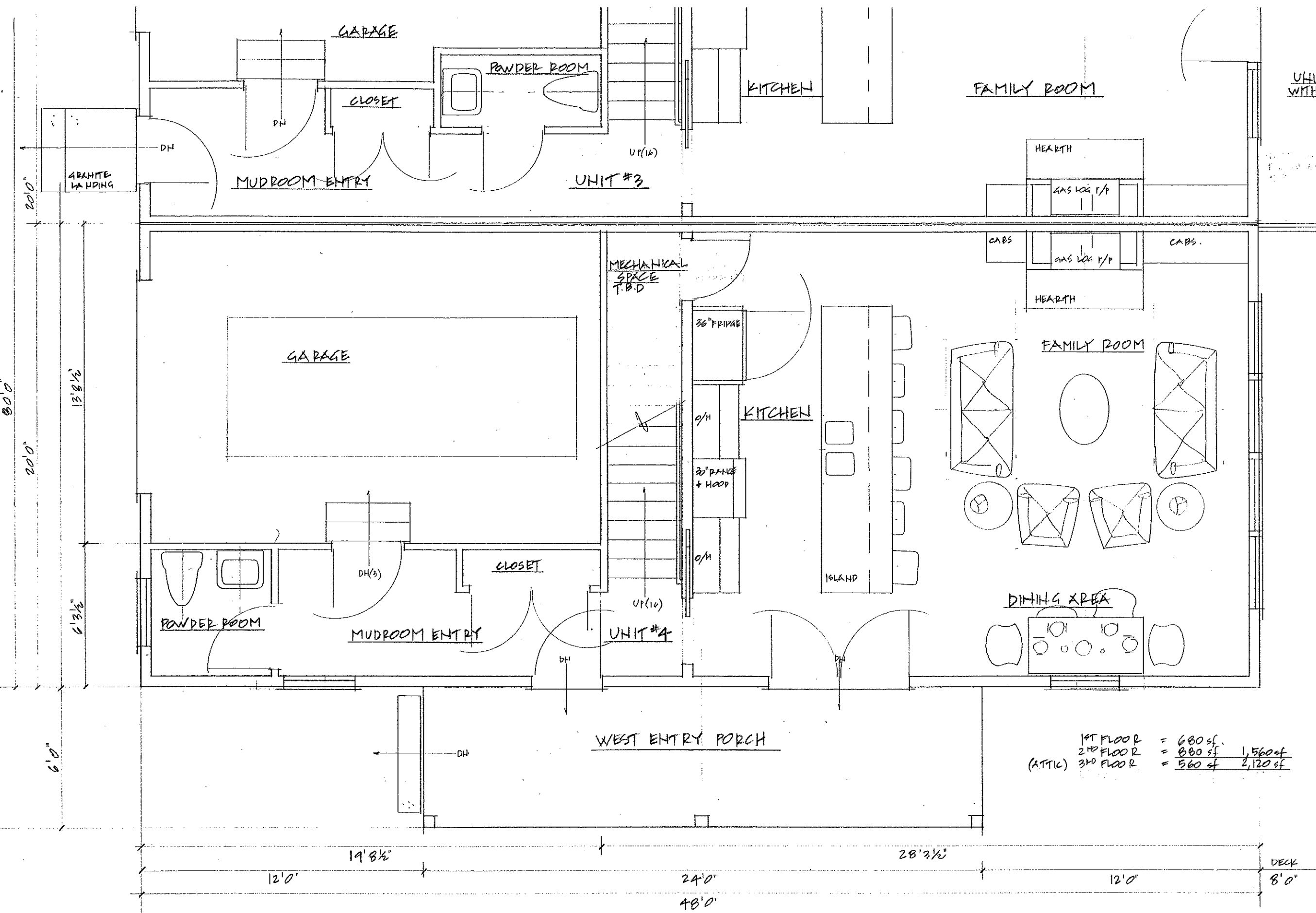


NORTH ELEVATION 1/8" = 1'0"

PROPOSED BUILDING AT
SARATOGA WAY
PORTSMOUTH, NH

TITLE: PROP SOUTH & NORTH ELEV'
SCALE: 1/8" = 1'0"
DATE: 9.10.2020

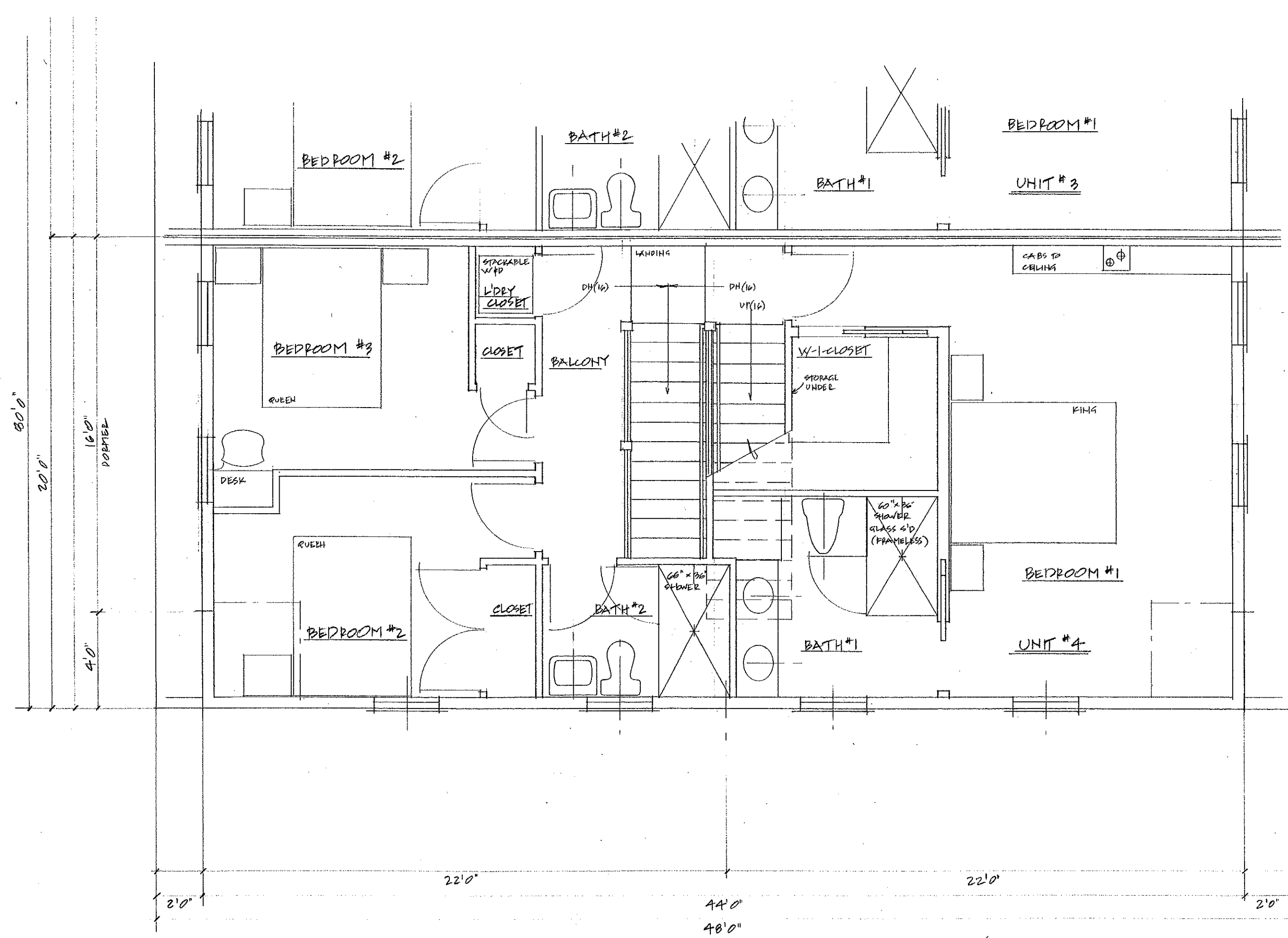
REVISIONS:



FIRST FLOOR PLAN, UNIT #4 (#3, #1 & #2 ARE MIRROR REVERSED)

HLS. = 680sf

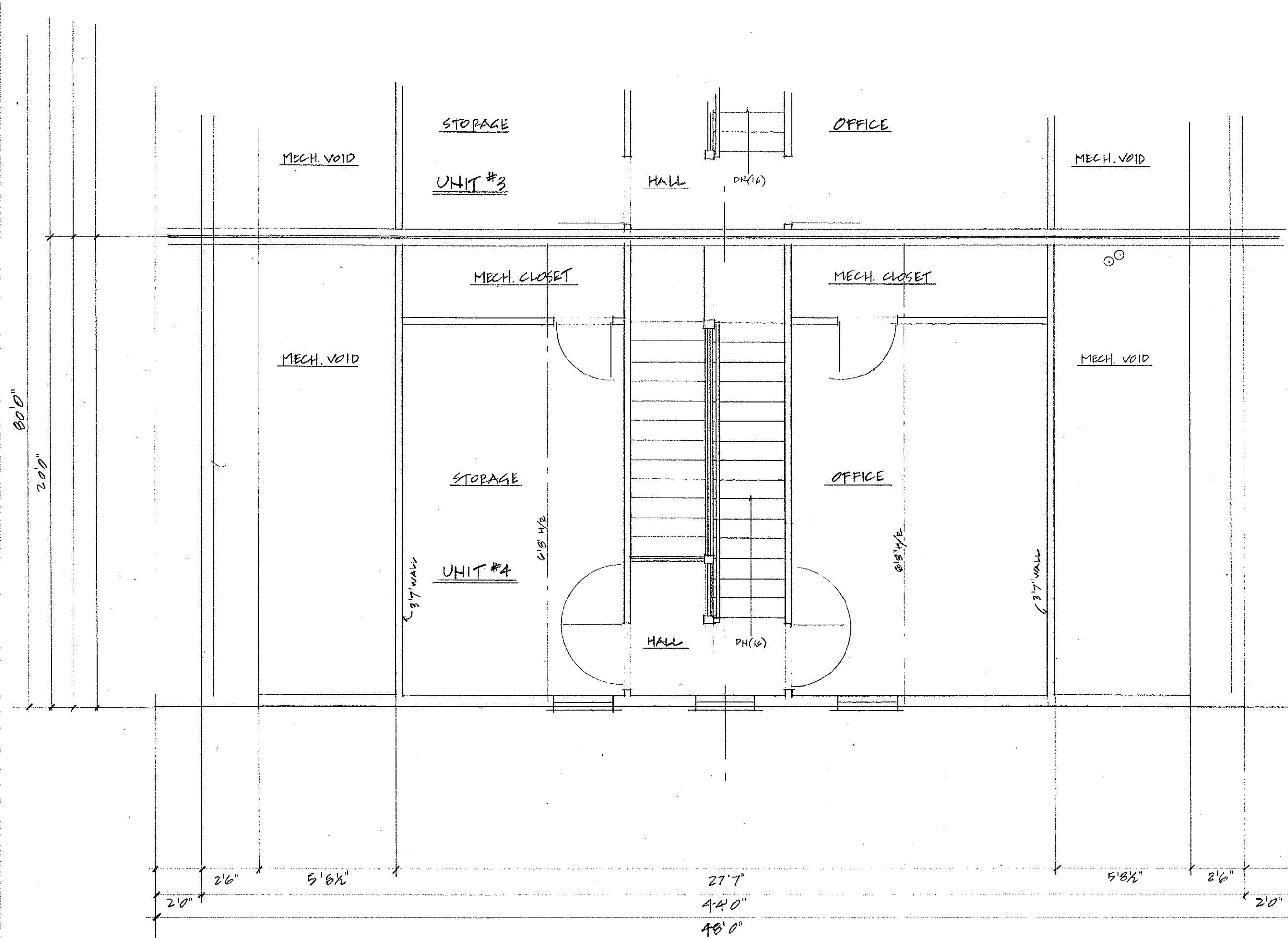
PROPOSED BUILDING AT TITLE: 1ST FL. PLAN
 SARATOGA WAY SCALE: 1/4" = 1'0"
 PORTSMOUTH, NH DATE: 9.10.2020
 REVISIONS:



SECOND FLOOR PLAN UNIT #4 (#3, #1 & #2 ARE MIRROR REVERSED)

HLS = 8804.

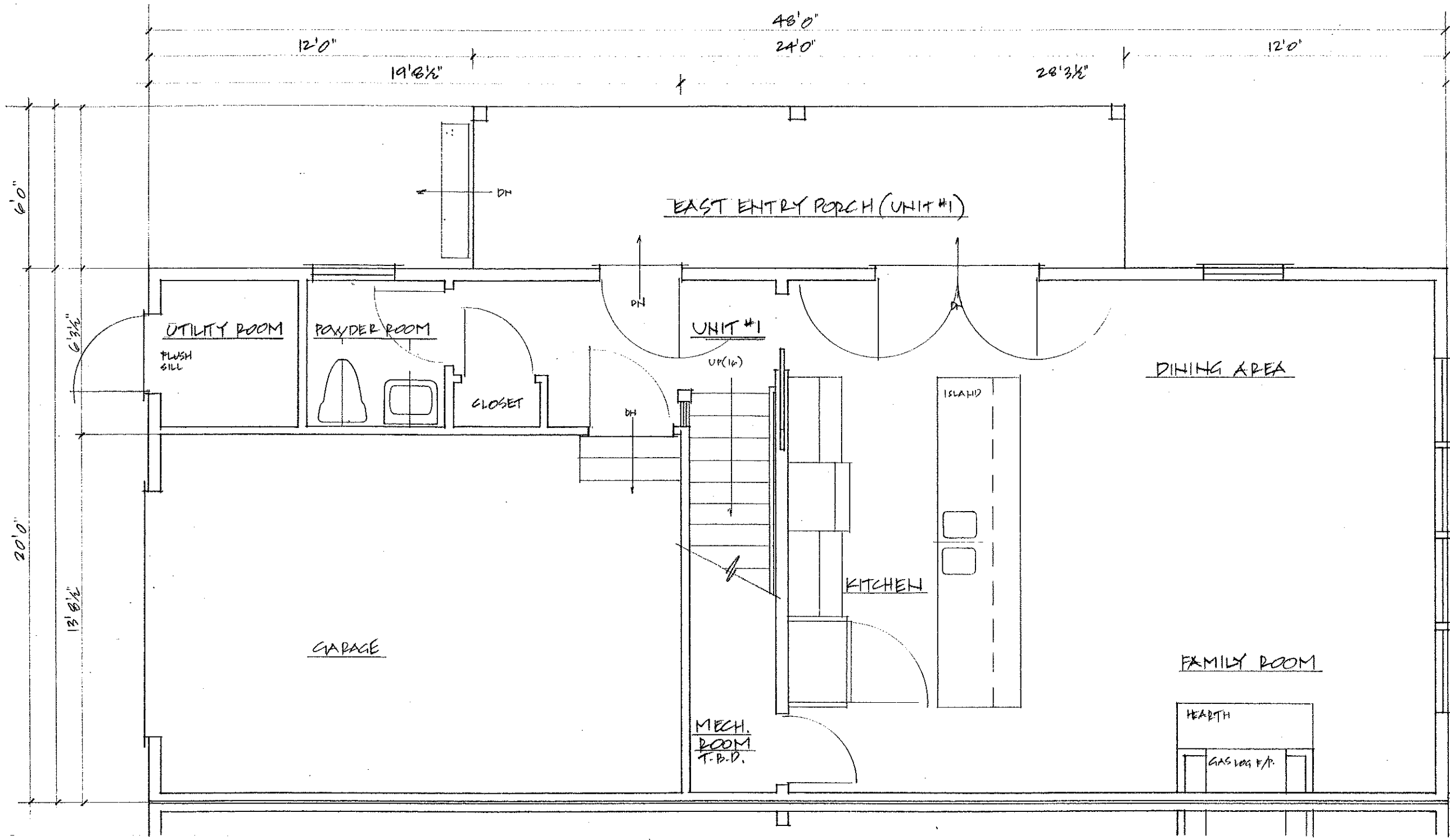
PROPOSED BUILDING AT TITLE: 2ND FLOOR PLAN
 SARATOGA WAY SCALE: 1/4" = 1'0"
 PORTSMOUTH, NH DATE: 3.30.2020
 REVISIONS:



THIRD FLOOR PLAN (ATTIC), UNIT #4 (1#3, #1 & #2 ARE MIRROR REV)

WITH 6'8" HEADROOM = 320sf, TO KNEE WALLS = 500sf.

PROPOSED BUILDING AT TITLE: 3RD FLOOR (ATTIC) PLAN
 SARATOGA WAY SCALE: 1/4" = 1'0"
 PORTSMOUTH, NH DATE: 3.30.2020
 REVISIONS:



FIRST FLOOR PLAN, UNIT #1

PROPOSED BUILDING AT TITLE: FIRST FLOOR PLAN, UNIT #1
 SARATOGA WAY, SCALE: 1/4" = 1'0"
 PORTSMOUTH, NH. DATE: 9.10.2020
 REVISIONS:

Ross Engineering
Civil/Structural Engineering & Surveying

909 Islington Street
Portsmouth, NH 03801

603-433-7560
alexross@comcast.net

October 28, 2020

Portsmouth Planning Department
1 Junkins Ave
Portsmouth, NH 03801

RE: Saratoga Way
Portsmouth, NH 03801
Tax Map 212, Lots 112 & 113

This project proposes to demolish an existing garage, remove a large area of asphalt and construct a new, 4-unit dwelling with attached decks and porches. Site improvements include a new driveway, a rain garden, stone detention pond, stormtech stormwater chambers, and landscaping.

We have received the necessary variances from the Board of Adjustment. We have met with TAC and incorporated all comments and concerns.

Sincerely,

Alex Ross, P.E.



City of Portsmouth, New Hampshire

Site Plan Application Checklist

This site plan application checklist is a tool designed to assist the applicant in the planning process and for preparing the application for Planning Board review. A pre-application conference with a member of the planning department is strongly encouraged as additional project information may be required depending on the size and scope. The applicant is cautioned that this checklist is only a guide and is not intended to be a complete list of all site plan review requirements. Please refer to the Site Plan review regulations for full details.

Applicant Responsibilities (Section 2.5.2): Applicable fees are due upon application submittal along with required attachments. The application shall be complete as submitted and provide adequate information for evaluation of the proposed site development. Waiver requests must be submitted in writing with appropriate justification.

Name of Owner/Applicant: Alex Ross Date Submitted: 9-17-20
 Phone Number: 603-433-7560 E-mail: alexross@comcast.net
 Site Address: Saratoga Way Map: 212 Lot: 112 & 113
 Zoning District: General Residence B Lot area: 14,944 sq. ft.

Application Requirements			
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	Fully executed and signed Application form. (2.5.2.3)	Online Land Use Application	N/A
<input checked="" type="checkbox"/>	All application documents, plans, supporting documentation and other materials provided in digital Portable Document Format (PDF) on compact disc, DVD or flash drive. (2.5.2.8)	Attached with Hard Copy Submittal	N/A

Site Plan Review Application Required Information			
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	Statement that lists and describes "green" building components and systems. (2.5.3.1A)	See Attached Green Building Description	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Gross floor area and dimensions of all buildings and statement of uses and floor area for each floor. (2.5.3.1B)	Architectural Plan Set A3 & A4	N/A
<input checked="" type="checkbox"/>	Tax map and lot number, and current zoning of all parcels under Site Plan Review. (2.5.3.1C)	Sheet 1 "Existing Conditions"	N/A
<input checked="" type="checkbox"/>	Owner's name, address, telephone number, and signature. Name, address, and telephone number of applicant if different from owner. (2.5.3.1D)	Jay McSharry Raleigh Way Holding Group 1 Middle St, Suite 1 Portsmouth, NH 03801 jaymsharry@me.com	N/A

Site Plan Review Application Required Information

<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	Names and addresses (including Tax Map and Lot number and zoning districts) of all direct abutting property owners (including properties located across abutting streets) and holders of existing conservation, preservation or agricultural preservation restrictions affecting the subject property. (2.5.3.1E)	See Attached Abutter's List	N/A
<input checked="" type="checkbox"/>	Names, addresses and telephone numbers of all professionals involved in the site plan design. (2.5.3.1F)	Sheet 1 "Existing Conditions"	N/A
<input checked="" type="checkbox"/>	List of reference plans. (2.5.3.1G)	Sheet 1 "Existing Conditions"	N/A
<input checked="" type="checkbox"/>	List of names and contact information of all public or private utilities servicing the site. (2.5.3.1H)	Sheet 3 "Utility Plan"	N/A

Site Plan Specifications

<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	Full size plans shall not be larger than 22 inches by 34 inches with match lines as required, unless approved by the Planning Director. Submittals shall be a minimum of 11 inches by 17 inches as specified by Planning Dept. staff. (2.5.4.1A)	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	Scale: Not less than 1 inch = 60 feet and a graphic bar scale shall be included on all plans. (2.5.4.1B)	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	GIS data should be referenced to the coordinate system New Hampshire State Plane, NAD83 (1996), with units in feet. (2.5.4.1C)	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	Plans shall be drawn to scale. (2.5.4.1D)	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	Plans shall be prepared and stamped by a NH licensed civil engineer. (2.5.4.1D)	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	Wetlands shall be delineated by a NH certified wetlands scientist. (2.5.4.1E)	No wetlands on site	N/A
<input checked="" type="checkbox"/>	Title (name of development project), north point, scale, legend. (2.5.4.2A)	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	Date plans first submitted, date and explanation of revisions. (2.5.4.2B)	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	Individual plan sheet title that clearly describes the information that is displayed. (2.5.4.2C)	Required on all plan sheets	N/A

Site Plan Specifications			
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	Source and date of data displayed on the plan. (2.5.4.2D)	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	A note shall be provided on the Site Plan stating: "All conditions on this Plan shall remain in effect in perpetuity pursuant to the requirements of the Site Plan Review Regulations." (2.5.4.2E)	Required on all plan sheets	N/A
<input checked="" type="checkbox"/>	Plan sheets submitted for recording shall include the following notes: <ul style="list-style-type: none"> a. "This Site Plan shall be recorded in the Rockingham County Registry of Deeds." b. "All improvements shown on this Site Plan shall be constructed and maintained in accordance with the Plan by the property owner and all future property owners. No changes shall be made to this Site Plan without the express approval of the Portsmouth Planning Director." (2.13.3)	Sheet 2 "Site Plan" & Sheet 5 "Landscape Plan"	N/A
<input checked="" type="checkbox"/>	Plan sheets showing landscaping and screening shall also include the following additional notes: <ul style="list-style-type: none"> a. "The property owner and all future property owners shall be responsible for the maintenance, repair and replacement of all required screening and landscape materials." b. "All required plant materials shall be tended and maintained in a healthy growing condition, replaced when necessary, and kept free of refuse and debris. All required fences and walls shall be maintained in good repair." c. "The property owner shall be responsible to remove and replace dead or diseased plant materials immediately with the same type, size and quantity of plant materials as originally installed, unless alternative plantings are requested, justified and approved by the Planning Board or Planning Director." (2.13.4)	Sheet 5 "Landscape Plan"	N/A

Site Plan Specifications – Required Exhibits and Data

<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
	1. Existing Conditions: (2.5.4.3A)		
<input checked="" type="checkbox"/>	a. Surveyed plan of site showing existing natural and built features;	Sheet 1 "Existing Conditions"	<input type="checkbox"/>
<input checked="" type="checkbox"/>	b. Zoning boundaries;	Sheet 1 - Note 2	<input type="checkbox"/>
<input checked="" type="checkbox"/>	c. Dimensional Regulations;	Sheet 1 - Note 2	<input type="checkbox"/>
<input checked="" type="checkbox"/>	d. Wetland delineation, wetland function and value assessment;	No wetlands on site	<input type="checkbox"/>
<input checked="" type="checkbox"/>	e. SFHA, 100-year flood elevation line and BFE data.	Sheet 1 - Note 4	<input type="checkbox"/>
	2. Buildings and Structures: (2.5.4.3B)		
<input checked="" type="checkbox"/>	a. Plan view: Use, size, dimensions, footings, overhangs, 1st fl. elevation;	Architectural - Page A.1	<input type="checkbox"/>
<input checked="" type="checkbox"/>	b. Elevations: Height, massing, placement, materials, lighting, façade treatments;	Architectural - Page A.1	<input type="checkbox"/>
<input checked="" type="checkbox"/>	c. Total Floor Area;	Architectural - Page A.3	<input type="checkbox"/>
<input checked="" type="checkbox"/>	d. Number of Usable Floors;	Architectural - Page A.3	<input type="checkbox"/>
<input checked="" type="checkbox"/>	e. Gross floor area by floor and use.	Architectural - Page A.3	<input type="checkbox"/>
	3. Access and Circulation: (2.5.4.3C)		
<input checked="" type="checkbox"/>	a. Location/width of access ways within site;	Sheet 2 "Site Plan"	<input type="checkbox"/>
<input checked="" type="checkbox"/>	b. Location of curbing, right of ways, edge of pavement and sidewalks;	Sheet 2 "Site Plan"	<input type="checkbox"/>
<input checked="" type="checkbox"/>	c. Location, type, size and design of traffic signing (pavement markings);	Sheet 2 "Site Plan"	<input type="checkbox"/>
<input checked="" type="checkbox"/>	d. Names/layout of existing abutting streets;	Sheet 1 "Existing Conditions"	<input type="checkbox"/>
<input checked="" type="checkbox"/>	e. Driveway curb cuts for abutting prop. and public roads;	Sheet 7 "Roadway Plan"	<input type="checkbox"/>
<input checked="" type="checkbox"/>	f. If subdivision; Names of all roads, right of way lines and easements noted;	N/A	<input type="checkbox"/>
<input checked="" type="checkbox"/>	g. AASHTO truck turning templates, description of minimum vehicle allowed being a WB-50 (unless otherwise approved by TAC).	N/A	<input type="checkbox"/>
	4. Parking and Loading: (2.5.4.3D)		
<input checked="" type="checkbox"/>	a. Location of off street parking/loading areas, landscaped areas/buffers;	No off street parking	<input type="checkbox"/>
<input checked="" type="checkbox"/>	b. Parking Calculations (# required and the # provided).	See Attached - Parking Demand Calculations	<input type="checkbox"/>
	5. Water Infrastructure: (2.5.4.3E)		
<input checked="" type="checkbox"/>	a. Size, type and location of water mains, shut-offs, hydrants & Engineering data;	Sheet 3 "Utility Plan"	<input type="checkbox"/>
<input checked="" type="checkbox"/>	b. Location of wells and monitoring wells (include protective radii).	N/A	<input type="checkbox"/>
	6. Sewer Infrastructure: (2.5.4.3F)		
<input checked="" type="checkbox"/>	a. Size, type and location of sanitary sewage facilities & Engineering data.	Sheet 3 "Utility Plan"	<input type="checkbox"/>
	7. Utilities: (2.5.4.3G)		
<input checked="" type="checkbox"/>	a. The size, type and location of all above & below ground utilities;	Sheet 3 "Utility Plan"	<input type="checkbox"/>
<input checked="" type="checkbox"/>	b. Size type and location of generator pads, transformers and other fixtures.	Sheet 3 "Utility Plan"	<input type="checkbox"/>

Site Plan Specifications – Required Exhibits and Data

<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	8. Solid Waste Facilities: (2.5.4.3H)		
<input checked="" type="checkbox"/>	a. The size, type and location of solid waste facilities.	Solid Waste to be Stored Inside Garage	<input type="checkbox"/>
	9. Storm water Management: (2.5.4.3I)		
<input checked="" type="checkbox"/>	a. The location, elevation and layout of all storm-water drainage.	Sheet 3 "Utility Plan"	<input type="checkbox"/>
	10. Outdoor Lighting: (2.5.4.3J)		
<input checked="" type="checkbox"/>	a. Type and placement of all lighting (exterior of building, parking lot and any other areas of the site) and;	Sheet 3 "Utility Plan"	<input type="checkbox"/>
	b. photometric plan.		
<input checked="" type="checkbox"/>	11. Indicate where dark sky friendly lighting measures have been implemented. (10.1)	Sheet 3 "Utility Plan"	<input type="checkbox"/>
	12. Landscaping: (2.5.4.3K)		
<input checked="" type="checkbox"/>	a. Identify all undisturbed area, existing vegetation and that which is to be retained;	Sheet 5 "Landscape Plan"	<input type="checkbox"/>
<input checked="" type="checkbox"/>	b. Location of any irrigation system and water source.	N/A	<input type="checkbox"/>
	13. Contours and Elevation: (2.5.4.3L)		
<input checked="" type="checkbox"/>	a. Existing/Proposed contours (2 foot minimum) and finished grade elevations.	Sheet 4 "Grading & Drainage Plan"	<input type="checkbox"/>
	14. Open Space: (2.5.4.3M)		
<input checked="" type="checkbox"/>	a. Type, extent and location of all existing/proposed open space.	Sheet 2 "Site Plan"	<input type="checkbox"/>
<input checked="" type="checkbox"/>	15. All easements, deed restrictions and non-public rights of ways. (2.5.4.3N)	N/A	<input type="checkbox"/>
<input checked="" type="checkbox"/>	16. Location of snow storage areas and/or off-site snow removal. (2.5.4.3O)	Sheet 4 - Note 5	<input type="checkbox"/>
<input checked="" type="checkbox"/>	17. Character/Civic District (All following information shall be included): (2.5.4.3Q)	N/A	<input type="checkbox"/>
	a. Applicable Building Height (10.5A21.20 & 10.5A43.30);		
	b. Applicable Special Requirements (10.5A21.30);		
	c. Proposed building form/type (10.5A43);		
	d. Proposed community space (10.5A46).		

Other Required Information			
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	Traffic Impact Study or Trip Generation Report, as required. <i>(Four (4) hardcopies of the full study/report and Six (6) summaries to be submitted with the Site Plan Application) (3.2.1-2)</i>	See Sheet 6 "Roadway Plan"	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Indicate where Low Impact Development Design practices have been incorporated. (7.1)	See Rain Garden on Sheet 2 "Site Plan"	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Indicate whether the proposed development is located in a wellhead protection or aquifer protection area. Such determination shall be approved by the Director of the Dept. of Public Works. (7.3.1)	Not in a wellhead protection or aquifer protection area	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Indicate where measures to minimize impervious surfaces have been implemented. (7.4.3)	See Rain Garden, Detention Pond, & Drip Edge on Sheet 2 "Site Plan"	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Calculation of the maximum effective impervious surface as a percentage of the site. (7.4.3.2)	Sheet 2 "Site Plan"	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Stormwater Management and Erosion Control Plan. <i>(Four (4) hardcopies of the full plan/report and Six (6) summaries to be submitted with the Site Plan Application) (7.4.4.1)</i>	Sheet 7 "Erosion Control Plan"	<input type="checkbox"/>

Final Site Plan Approval Required Information			
<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	All local approvals, permits, easements and licenses required, including but not limited to: <ul style="list-style-type: none"> a. Waivers; b. Driveway permits; c. Special exceptions; d. Variances granted; e. Easements; f. Licenses. (2.5.3.2A)	See ZBA Letter of Approval dated June 17, 2020	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Exhibits, data, reports or studies that may have been required as part of the approval process, including but not limited to: <ul style="list-style-type: none"> a. Calculations relating to stormwater runoff; b. Information on composition and quantity of water demand and wastewater generated; c. Information on air, water or land pollutants to be discharged, including standards, quantity, treatment and/or controls; d. Estimates of traffic generation and counts pre- and post-construction; e. Estimates of noise generation; f. A Stormwater Management and Erosion Control Plan; g. Endangered species and archaeological / historical studies; h. Wetland and water body (coastal and inland) delineations; i. Environmental impact studies. (2.5.3.2B)	Drainage Report Dated 8-17-20 & Sheet 7 "Erosion Control Plan"	<input type="checkbox"/>

Final Site Plan Approval Required Information

<input checked="" type="checkbox"/>	Required Items for Submittal	Item Location (e.g. Page/line or Plan Sheet/Note #)	Waiver Requested
<input checked="" type="checkbox"/>	A document from each of the required private utility service providers indicating approval of the proposed site plan and indicating an ability to provide all required private utilities to the site. (2.5.3.2D)	Letters to serve the building shall be submitted	<input type="checkbox"/>
<input checked="" type="checkbox"/>	A list of any required state and federal permit applications required for the project and the status of same. (2.5.3.2E)	N/A	<input type="checkbox"/>

Applicant's Signature:  Date: 9/21/20

Ross Engineering
Civil/Structural Engineering & Surveying

909 Islington Street
Portsmouth, NH 03801

603-433-7560
alexross@comcast.net

August 24, 2020

Parking Demand Analysis

As per the City Zoning Ordinance sections:

10.1112.311 -Parking for Residential Uses, a minimum of 1.3 spaces per unit is required for dwellings over 750 s.f.

4 units each over 750 s.f.= 1.3 x 4= 5.2 round up to**6 spaces**
Spaces Provided.....**8 spaces**

There is sufficient on-site parking on the property as 8 spaces (2 per unit) are provided. This is greater than the requirement of 6 as per the City Zoning Ordinance.

Parking Calculations Based on Zoning Ordinance: Amended through December 16, 2019

Residential Units:

As per 10.1112.311 of Article 11 Site Development Standards
1.3 spaces per unit with Over 750 sq. ft. shall be provided
2 Residential Units exist with 3 parking spaces required

Description of “Green” Building Approach, Components and Systems for New, (4) Unit Residential Condominium Building at Saratoga Way, Portsmouth

- Massing of the structure. By embracing a single, cohesive structure containing the (4) units, we generate the most favorable ratio of exterior wall/roof to interior space.
- By creating an elongated building, aligned East/West we are able to maximize favorable orientation to sun exposure.
- The gambrel roof provides the most favorable location for solar PV and hot water panels. It is anticipated that this building will eventually accommodate independent energy production.
- By providing on site, covered and heated parking, we accommodate the transition to electric vehicles, and the need for suitable charging stations.
- We will follow or exceed the guidelines of the Federal Energy Star program.
- The quality of the Thermal Enclosure will be assured through the use of High Performance Windows, Quality Installed Insulation (Closed Cell spray foam), Fully-Aligned Air Barriers (spray foam), Reduced Thermal Bridging (continuous exterior foam layer) and Air Sealing (spray foam and thorough caulking)
- HVAC efficiencies will be achieved through the use of Air Source Heat Pumps (Mitsubishi Multizone Ductless Hyper Heat Pumps). Domestic Hot Water will be provided by Solar Hot Water panels with natural gas back up. Energy Recovery Ventilation systems will be installed to each unit.
- Water saving appliances will be used where possible, i.e., Front Loading Washers.
- See Site Plans for storm water mitigation approaches.

**Ross Engineering, LLC
Civil / Structural Engineering**

**909 Islington Street
Portsmouth, NH 03801**

**603-433-7560
alexross@comcast.net**

**Saratoga Way
Project Description**

August 4, 2020

This site review application involves combining Tax Map 212, Lots 112 & 113. Currently there is a garage, a shed, and an area of pavement on these parcels. The existing structures will be removed and a 4 unit multi-family dwelling will be constructed. A new driveway permit off of Saratoga Way will be applied for, underground utilities will be connected in Saratoga Way. The necessary Board of Adjustment approvals were granted for this project at the June 17, 2020 meeting.

Sincerely,

Alex Ross, P.E.
Ross Engineering
909 Islington St. Suite 6
Portsmouth, NH, 03801

PLAN FOR STORMWATER MANAGEMENT

**For Property Located At:
Saratoga Way
Tax Map 212, Lots 112 & 113
Portsmouth, NH 03801**

**Prepared by:
Alex Ross, P.E.
Ross Engineering
January 7, 2021**

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Site Description

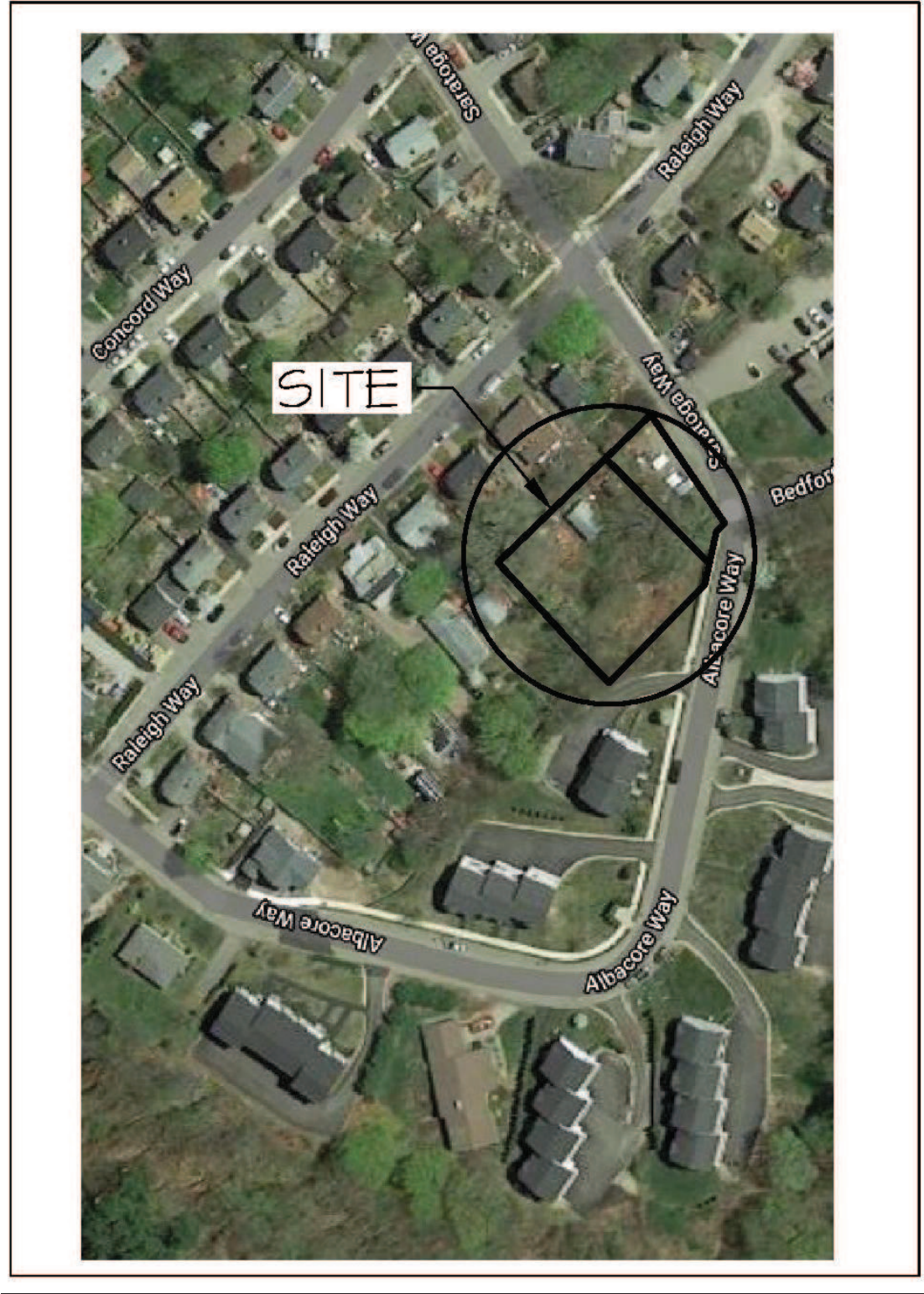
The parcel being analyzed is located along Saratoga Way in Portsmouth, NH. This site is made up of 2 lots, Tax Map 212, Lots 112 & 113, 0.27 and 0.07 acres in size respectively. The proposed improvements offer an opportunity to control stormwater and provide protection to the surrounding lots.

The Site is located at the lowest part of a larger watershed composing most of the block of Raleigh Way, Albacore Way, and Saratoga Way. Water in this watershed flows south west through this lot to an 18” culvert in the southwest. The County Soil Survey Map describes the soil in the area as 799, “Urban Land-Canton complex”. This soil is in the hydrologic soil group C which was used in modeling stormwater events. Three test pits have been dug on site.

A large development adjacent to this site prepared a drainage study, however they incorrectly utilized a type II rainfall. Additionally, they utilized proposed contours that do not reflect the site conditions, resulting in a larger subcatchment area than what exists, making comparison of numbers not apples to apples.



Aerial View



Drainage Design

Pre-development stormwater runoff flows must be analyzed to establish a comparable baseline for post-development flows. A stormwater management system should be installed that will adequately handle any increased post-development runoff.

The stormwater runoff analysis of the site was based on the **two, ten, twenty-five,** and **fifty** year storm event as per the City Site Plan Review Regulations, Section 7.4.2.8. The research method applied was the TR-55 method, which was developed from the U.S. Soil Conservation Service's TR-20 runoff procedure. The TR-55 Manual describes the method as a "...procedure to calculate storm runoff, peak rate of discharge, hydrographs, and storage volumes required for floodwater reservoirs." The model begins with a rainfall amount uniformly imposed on the watershed over a specified time distribution. Mass rainfall is converted to mass runoff by using a runoff curve number (CN). The curve number is based on soils, plant cover, amount of impervious area, interception, and surface storage to determine a coefficient representing the capability of a surface to infiltrate stormwater. Runoff is then transformed into a hydrograph by using the unit hydrograph theory and routing procedures through segments of the watershed. A hydrograph models the volume of runoff with respect to time, reflecting the unit hydrograph theory, which is that a one-day rainfall event produces a one inch depth of runoff over a given area. The routing of runoff is segmented into areas of the watershed dependent on topography and travel time. These segmented areas are known as subcatchments. Modeling calculations were performed using the HydroCAD stormwater modeling system version 10.

Proposed Development

The existing garage will be removed. A 4 Unit Condo Building with 2 attached decks, and 2 attached covered porches is proposed. In addition, an asphalt driveway and pervious pavement parking area is proposed along the northeast side of the parcel. Two 2' wide stone infiltration trenches are proposed to collect southern and eastern roof runoff, reducing the rate at which roof runoff reaches the existing 18" culvert. A rain garden is proposed northeast of the proposed pervious pavement parking area to collect runoff from the lots to the north and north east. This water is directed into the subbase of the pervious pavement through 3 – 12" culverts. This water is stored in the pervious pavement with an outlet (2 – 10" culverts) into a stone detention pond to the west. This water is stored in the stone detention pond (which also collects runoff from the northwest), being released to the 18" culvert. A percolation test was performed on the soil with the rate found being 11 min/in. Due to the elevation of the seasonal high water table in the area, exfiltration was not used for this analysis.

Results of Drainage Analysis

Pre-Development Runoff

One subcatchment area was utilized to model the pre-development stormwater conditions. This subcatchment is comprised of the developed area between Albacore Way, Saratoga Way, & Raleigh Way. Runoff from this subcatchment flows to the south to the 18" culvert in the SW portion of the parcel.

Post-Development Runoff

The subcatchment areas for the post-development stormwater conditions were modeled similarly to the pre-development conditions.

Subcatchment 1 collects runoff from the southwest portion of the area being analyzed, directing it to the 18” culvert in the SW portion of the parcel.

Subcatchment 2 collects runoff from the center portion of the area being analyzed as well as the west porch roof, directing it to a stone detention pond, before being released to the 18” culvert in the SW portion of the parcel.

Subcatchment 3 collects runoff from the north portion of the area being analyzed, directing it into a rain garden, then through the pervious pavement subbase then through a stone detention pond, before being released to the 18” culvert in the SW portion of the parcel.

Subcatchment 4 collects runoff from the South Roof of the main building directing it to a 2’ wide infiltration trench (IT B), then to a Catch Basin (CB C), then through a 6” culvert (C-4), then to the 18” culvert in the SW portion of the parcel.

Subcatchment 5 collects runoff from the Eastern Porch Roof as well as area south east of the building, directing it into a 2’ wide Infiltration Trench B (IT A), then to a Catch Basin (CB A), then to another Catch Basin (CB B), then through a 2’ wide Infiltration Trench (IT B), then to another Catch Basin (CB C), then through a 16 culvert (C-4), then to the 18” culvert in the SW portion of the parcel.

Subcatchment 6 collects runoff from the northern house roof directing it onto the pervious pavement, then to a stone detention pond, then to the 18” culvert in the SW portion of the parcel.

Subcatchment 7 collects runoff from the asphalt driveway and pervious pavement parking area directing it into the pervious pavement, then to a stone detention pond, then to the 18" culvert in the SW portion of the parcel.

Drainage Summary

As required by the City of Portsmouth's Site Plan Review Regulations for Stormwater Management Best Practices (Section 7.4.2.8), the **two, ten, twenty-five, and fifty** year storm events were analyzed. The post-development flow meets or exceeds the requirements set forth by the city, resulting in no net increase in stormwater runoff rates. As shown on the plan, the stormwater system will adequately handle the post-development peak rate of runoff.

The proposed site improvements will have a positive drainage impact on the neighborhood and the city. Currently the flow from the majority of the block travels through this site to the 18" culvert located just off the property. The stormwater control measures provided by the infiltration trench, rain garden, stone detention pond, and pervious pavement will reduce the rate of runoff.

Rate of Runoff Comparison

Pre-Development (CFS)				
Analysis Points	2yr	10yr	25yr	50yr
Analysis Point 1	3.00	5.13	6.44	7.16
Post-Development (CFS)				
Analysis Point 1	2.49	4.61	6.09	7.16
Decrease in Flow (CFS)				
Analysis Point 1	0.51	0.52	0.35	0.00


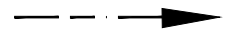

Total Volume Comparison

Pre-Development (Acre-Feet)				
Analysis Points	2yr	10yr	25yr	50yr
Analysis Point 1	0.27	0.52	0.73	0.93
Post-Development (Acre-Feet)				
Analysis Point 1	0.26	0.51	0.72	0.92
Decrease in Volume (Acre-Feet)				
Analysis Point 1	0.01	0.01	0.01	0.01

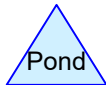
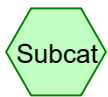
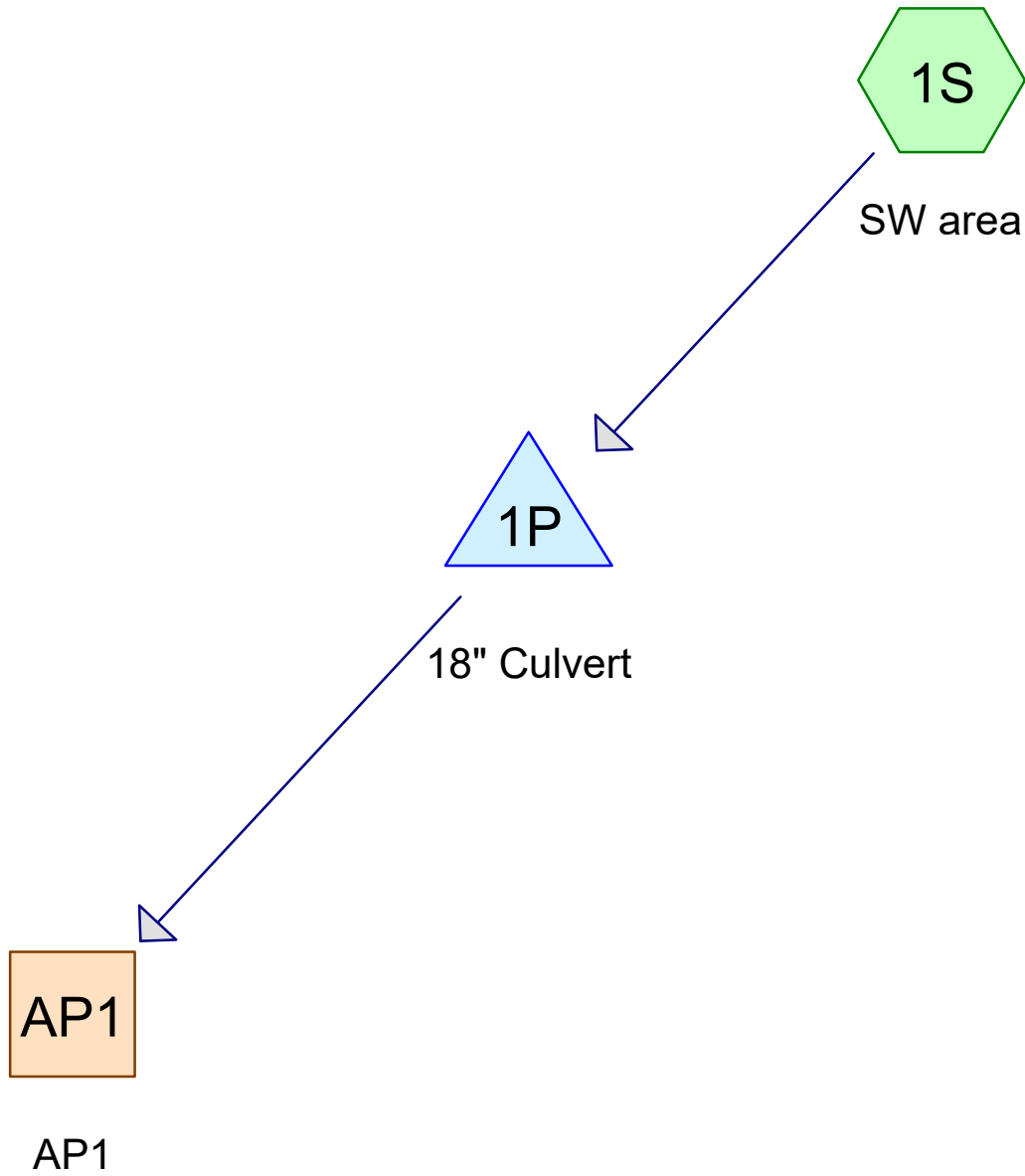
PRE-DEVELOPMENT CALCULATIONS



LEGEND

-  SUBCATCHMENT
-  DRAINAGE FLOW PATH
-  ANALYSIS POINT

PRE-DEVELOPMENT
SCALE: 1" = 50'



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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.549	79	1 acre lots, 20% imp, HSG C (1S)
0.299	74	>75% Grass cover, Good, HSG C (1S)
0.000	96	Gravel surface, HSG C (1S)
0.035	98	Paved parking, HSG C (1S)
0.001	98	Retaining Wall, HSG C (1S)
0.011	98	Roofs, HSG C (1S)
1.896	79	TOTAL AREA

Saratoga Way Pre 12-1-2020

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
1.896	HSG C	1S
0.000	HSG D	
0.000	Other	
1.896		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	1.549	0.000	0.000	1.549	1 acre lots, 20% imp	1S
0.000	0.000	0.299	0.000	0.000	0.299	>75% Grass cover, Good	1S
0.000	0.000	0.000	0.000	0.000	0.000	Gravel surface	1S
0.000	0.000	0.035	0.000	0.000	0.035	Paved parking	1S
0.000	0.000	0.001	0.000	0.000	0.001	Retaining Wall	1S
0.000	0.000	0.011	0.000	0.000	0.011	Roofs	1S
0.000	0.000	1.896	0.000	0.000	1.896	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	54.42	54.27	88.0	0.0017	0.012	18.0	0.0	0.0

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Type III 24-hr 2 yr Rainfall=3.68"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SW area

Runoff Area=82,592 sf 18.85% Impervious Runoff Depth>1.70"
Flow Length=394' Tc=6.4 min CN=79 Runoff=3.72 cfs 0.269 af

ReachAP1: AP1

Inflow=3.00 cfs 0.268 af
Outflow=3.00 cfs 0.268 af

Pond 1P: 18" Culvert

Peak Elev=55.49' Storage=771 cf Inflow=3.72 cfs 0.269 af
18.0" Round Culvert n=0.012 L=88.0' S=0.0017 '/' Outflow=3.00 cfs 0.268 af

Total Runoff Area = 1.896 ac Runoff Volume = 0.269 af Average Runoff Depth = 1.70"
81.15% Pervious = 1.539 ac 18.85% Impervious = 0.357 ac

Summary for Subcatchment 1S: SW area

Runoff = 3.72 cfs @ 12.10 hrs, Volume= 0.269 af, Depth> 1.70"

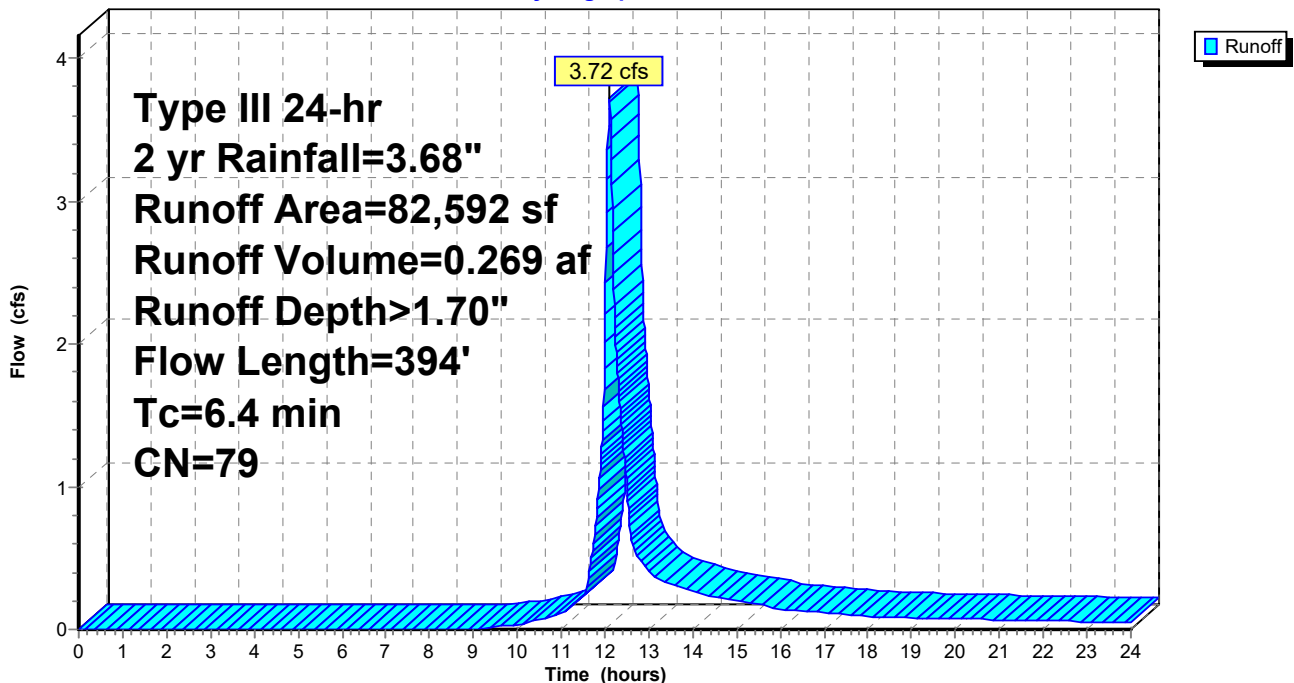
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.68"

Area (sf)	CN	Description
67,463	79	1 acre lots, 20% imp, HSG C
13,040	74	>75% Grass cover, Good, HSG C
497	98	Roofs, HSG C
15	96	Gravel surface, HSG C
1,542	98	Paved parking, HSG C
* 35	98	Retaining Wall, HSG C
82,592	79	Weighted Average
67,025		81.15% Pervious Area
15,567		18.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0250	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.68"
1.6	344	0.0600	3.67		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.4	394	Total			

Subcatchment 1S: SW area

Hydrograph



Summary for Reach AP1: AP1

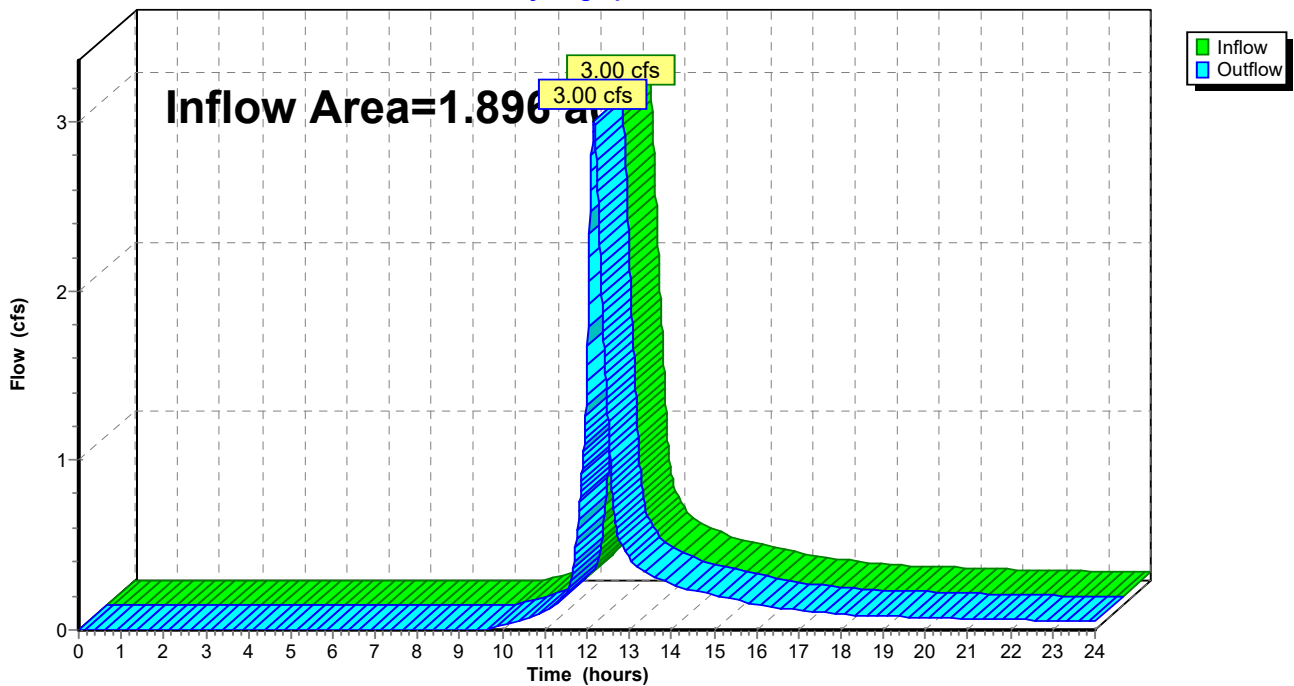
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.896 ac, 18.85% Impervious, Inflow Depth > 1.70" for 2 yr event
Inflow = 3.00 cfs @ 12.16 hrs, Volume= 0.268 af
Outflow = 3.00 cfs @ 12.16 hrs, Volume= 0.268 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach AP1: AP1

Hydrograph



Summary for Pond 1P: 18" Culvert

Inflow Area = 1.896 ac, 18.85% Impervious, Inflow Depth > 1.70" for 2 yr event
 Inflow = 3.72 cfs @ 12.10 hrs, Volume= 0.269 af
 Outflow = 3.00 cfs @ 12.16 hrs, Volume= 0.268 af, Atten= 19%, Lag= 3.7 min
 Primary = 3.00 cfs @ 12.16 hrs, Volume= 0.268 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 55.49'@ 12.16 hrs Surf.Area= 1,876 sf Storage= 771 cf

Plug-Flow detention time=6.1 min calculated for 0.268 af (100% of inflow)
 Center-of-Mass det. time=3.8 min (842.2 - 838.3)

Volume	Invert	Avail.Storage	Storage Description		
#1	54.25'	7,948 cf	Custom Stage Data (Irregular) listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.25	80	30.0	0	0	80
55.00	540	99.0	207	207	790
56.00	4,082	256.0	2,036	2,243	5,229
57.00	7,500	400.0	5,705	7,948	12,753

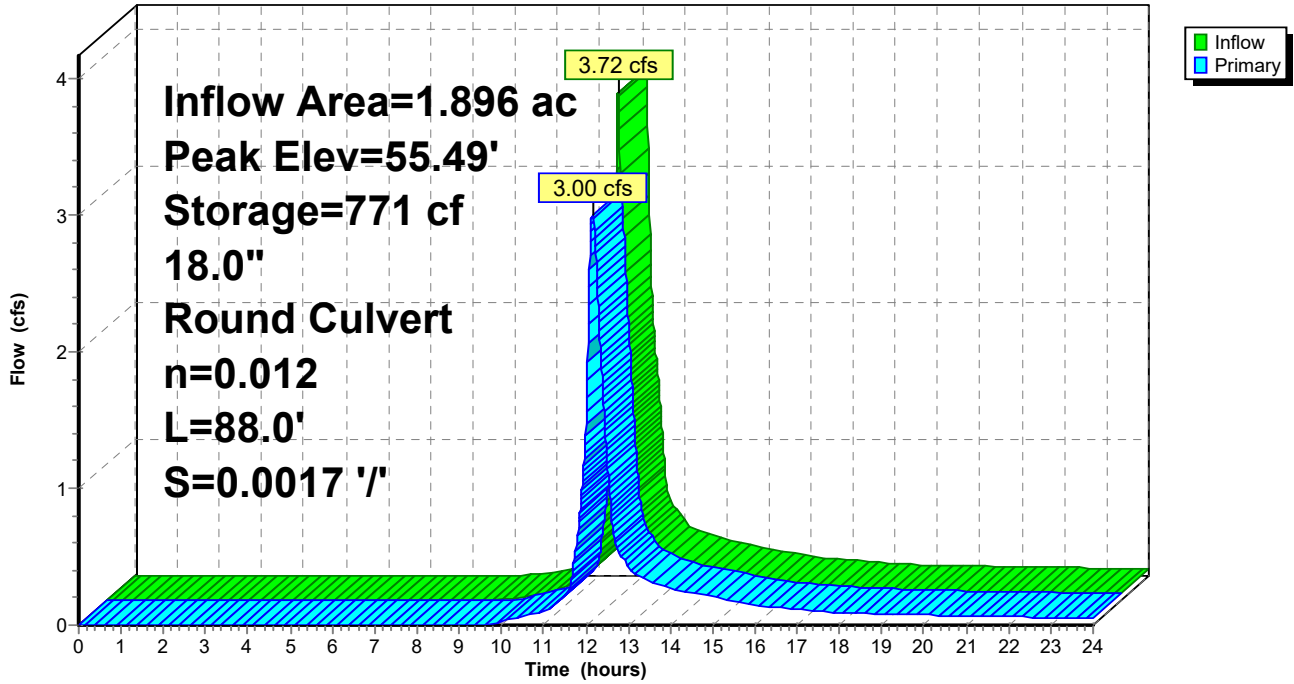
Device	Routing	Invert	Outlet Devices
#1	Primary	54.42'	18.0" Round Culvert L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 54.42' / 54.27' S= 0.0017'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.00 cfs @ 12.16 hrs HW=55.49' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 3.00 cfs @ 3.11 fps)

Pond 1P: 18" Culvert

Hydrograph



Saratoga Way Pre 12-1-2020

Type III 24-hr 10 yr Rainfall=5.57"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SW area

Runoff Area=82,592 sf 18.85% Impervious Runoff Depth>3.29"
Flow Length=394' Tc=6.4 min CN=79 Runoff=7.22 cfs 0.521 af

ReachAP1: AP1

Inflow=5.13 cfs 0.519 af
Outflow=5.13 cfs 0.519 af

Pond 1P: 18" Culvert

Peak Elev=55.91' Storage=1,911 cf Inflow=7.22 cfs 0.521 af
18.0" Round Culvert n=0.012 L=88.0' S=0.0017 '/' Outflow=5.13 cfs 0.519 af

Total Runoff Area = 1.896 ac Runoff Volume = 0.521 af Average Runoff Depth = 3.29"
81.15% Pervious = 1.539 ac 18.85% Impervious = 0.357 ac

Summary for Subcatchment 1S: SW area

Runoff = 7.22 cfs @ 12.09 hrs, Volume= 0.521 af, Depth> 3.29"

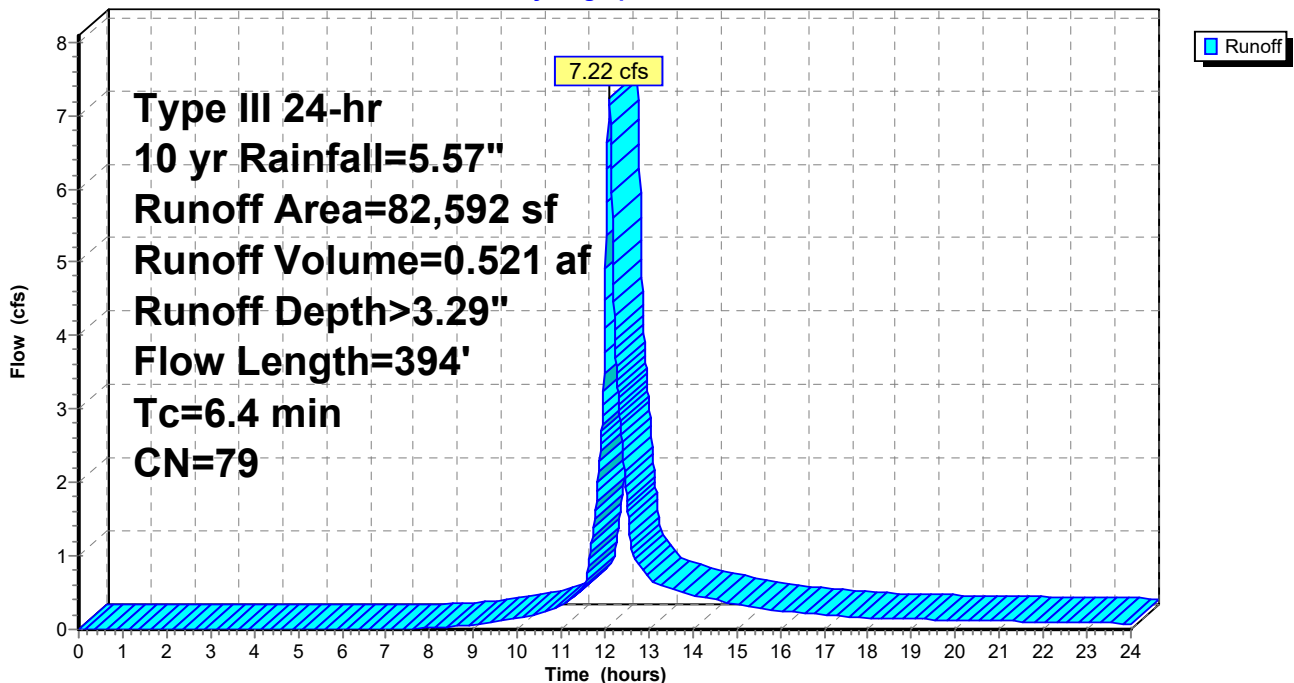
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.57"

Area (sf)	CN	Description
67,463	79	1 acre lots, 20% imp, HSG C
13,040	74	>75% Grass cover, Good, HSG C
497	98	Roofs, HSG C
15	96	Gravel surface, HSG C
1,542	98	Paved parking, HSG C
*	35	Retaining Wall, HSG C
82,592	79	Weighted Average
67,025		81.15% Pervious Area
15,567		18.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0250	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.68"
1.6	344	0.0600	3.67		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.4	394	Total			

Subcatchment 1S: SW area

Hydrograph



Summary for Reach AP1: AP1

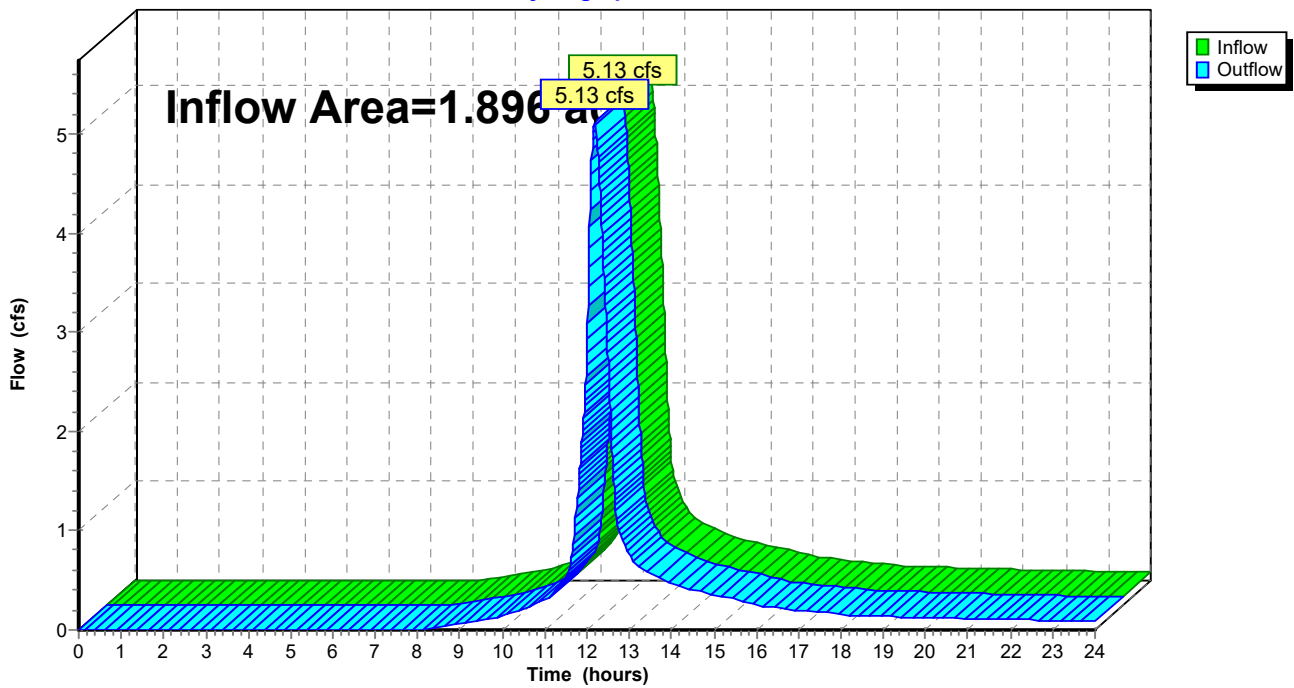
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.896 ac, 18.85% Impervious, Inflow Depth > 3.29" for 10 yr event
Inflow = 5.13 cfs @ 12.17 hrs, Volume= 0.519 af
Outflow = 5.13 cfs @ 12.17 hrs, Volume= 0.519 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach AP1: AP1

Hydrograph



Summary for Pond 1P: 18" Culvert

Inflow Area = 1.896 ac, 18.85% Impervious, Inflow Depth > 3.29" for 10 yr event
 Inflow = 7.22 cfs @ 12.09 hrs, Volume= 0.521 af
 Outflow = 5.13 cfs @ 12.17 hrs, Volume= 0.519 af, Atten= 29%, Lag= 4.9 min
 Primary = 5.13 cfs @ 12.17 hrs, Volume= 0.519 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 55.91'@ 12.17 hrs Surf.Area= 3,648 sf Storage= 1,911 cf

Plug-Flow detention time=5.5 min calculated for 0.519 af (100% of inflow)
 Center-of-Mass det. time=4.1 min (823.5 - 819.4)

Volume	Invert	Avail.Storage	Storage Description		
#1	54.25'	7,948 cf	Custom Stage Data (Irregular) listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.25	80	30.0	0	0	80
55.00	540	99.0	207	207	790
56.00	4,082	256.0	2,036	2,243	5,229
57.00	7,500	400.0	5,705	7,948	12,753

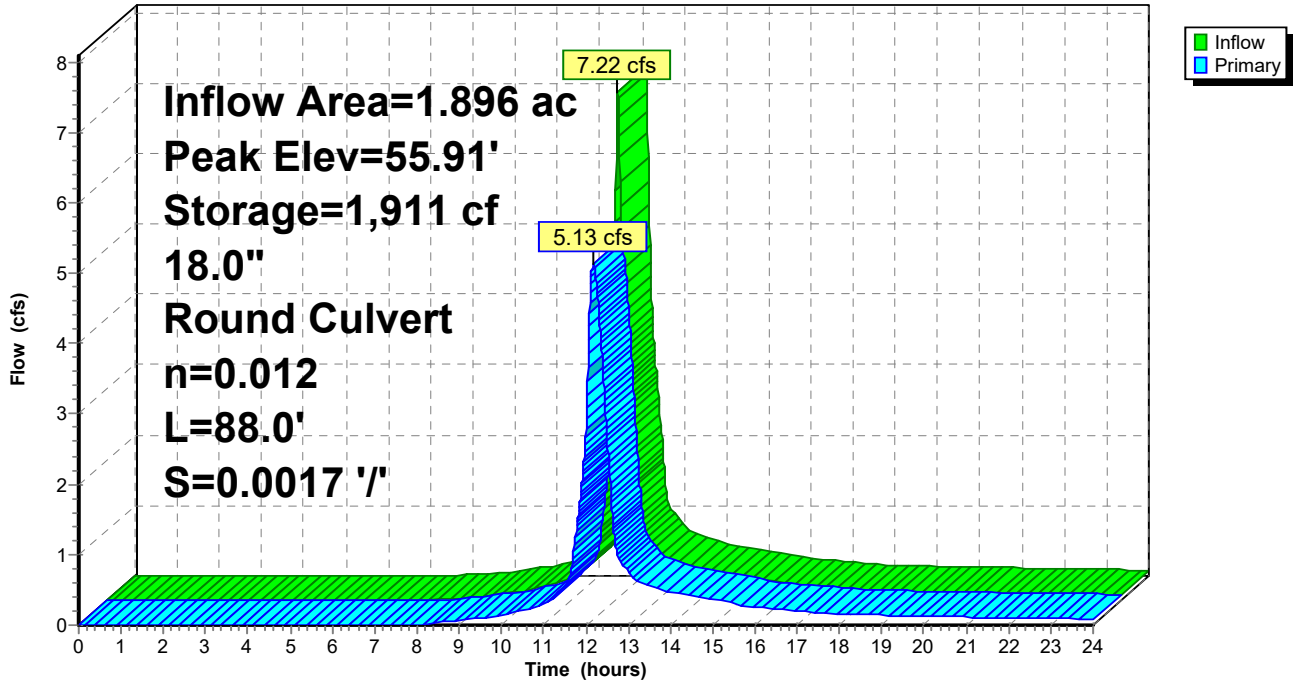
Device	Routing	Invert	Outlet Devices
#1	Primary	54.42'	18.0" Round Culvert L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 54.42' / 54.27' S= 0.0017'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=5.13 cfs @ 12.17 hrs HW=55.91' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 5.13 cfs @ 3.62 fps)

Pond 1P: 18" Culvert

Hydrograph



Saratoga Way Pre 12-1-2020

Type III 24-hr 25 yr Rainfall=7.06"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SW area

Runoff Area=82,592 sf 18.85% Impervious Runoff Depth>4.63"
Flow Length=394' Tc=6.4 min CN=79 Runoff=10.09 cfs 0.732 af

ReachAP1: AP1

Inflow=6.44 cfs 0.731 af
Outflow=6.44 cfs 0.731 af

Pond 1P: 18" Culvert

Peak Elev=56.21' Storage=3,159 cf Inflow=10.09 cfs 0.732 af
18.0" Round Culvert n=0.012 L=88.0' S=0.0017 '/' Outflow=6.44 cfs 0.731 af

Total Runoff Area = 1.896 ac Runoff Volume = 0.732 af Average Runoff Depth = 4.63"
81.15% Pervious = 1.539 ac 18.85% Impervious = 0.357 ac

Summary for Subcatchment 1S: SW area

Runoff = 10.09 cfs @ 12.09 hrs, Volume= 0.732 af, Depth> 4.63"

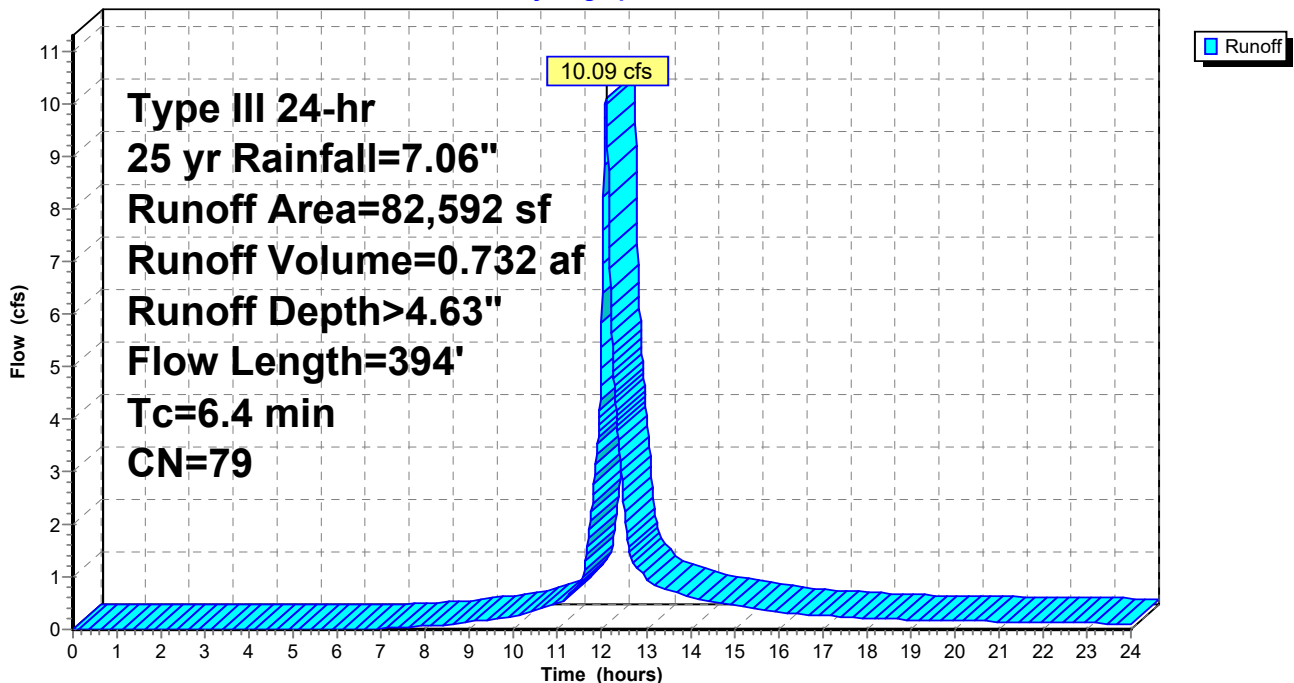
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=7.06"

Area (sf)	CN	Description
67,463	79	1 acre lots, 20% imp, HSG C
13,040	74	>75% Grass cover, Good, HSG C
497	98	Roofs, HSG C
15	96	Gravel surface, HSG C
1,542	98	Paved parking, HSG C
* 35	98	Retaining Wall, HSG C
82,592	79	Weighted Average
67,025		81.15% Pervious Area
15,567		18.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0250	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.68"
1.6	344	0.0600	3.67		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.4	394	Total			

Subcatchment 1S: SW area

Hydrograph



Summary for Reach AP1: AP1

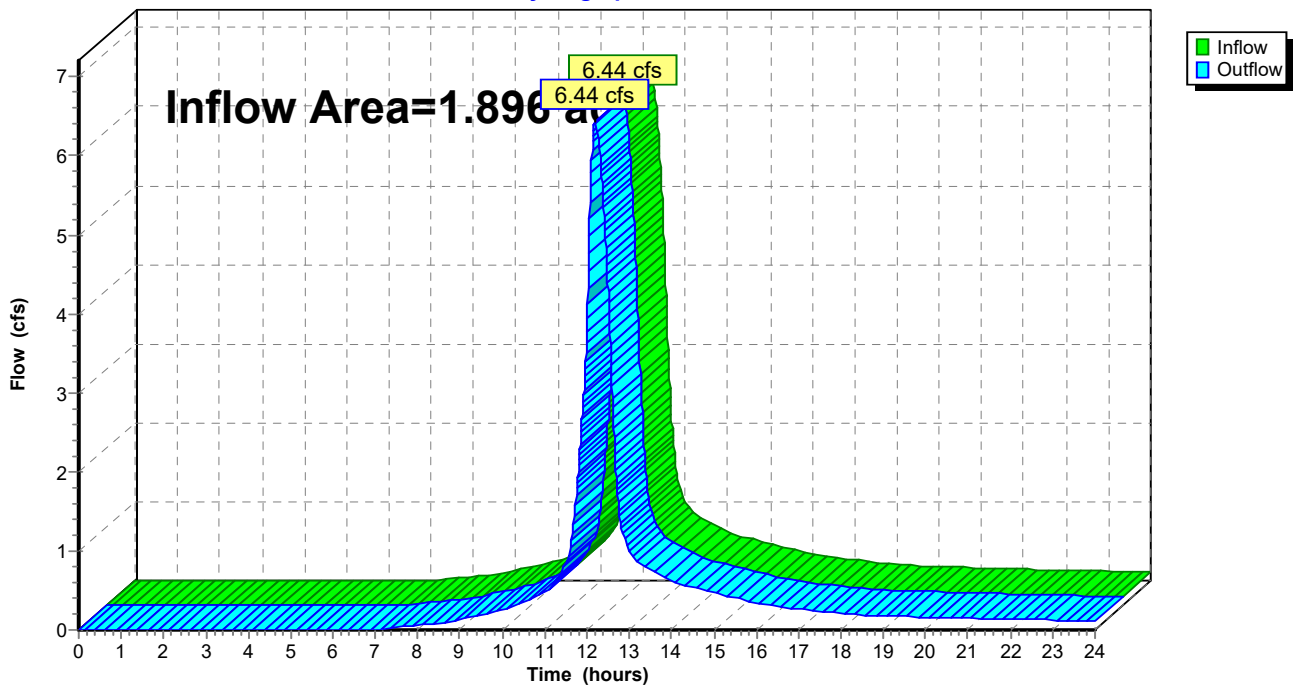
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.896 ac, 18.85% Impervious, Inflow Depth > 4.63" for 25 yr event
Inflow = 6.44 cfs @ 12.19 hrs, Volume= 0.731 af
Outflow = 6.44 cfs @ 12.19 hrs, Volume= 0.731 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach AP1: AP1

Hydrograph



Summary for Pond 1P: 18" Culvert

Inflow Area = 1.896 ac, 18.85% Impervious, Inflow Depth > 4.63" for 25 yr event
 Inflow = 10.09 cfs @ 12.09 hrs, Volume= 0.732 af
 Outflow = 6.44 cfs @ 12.19 hrs, Volume= 0.731 af, Atten= 36%, Lag= 6.0 min
 Primary = 6.44 cfs @ 12.19 hrs, Volume= 0.731 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 56.21' @ 12.19 hrs Surf.Area= 4,710 sf Storage= 3,159 cf

Plug-Flow detention time=5.7 min calculated for 0.731 af (100% of inflow)
 Center-of-Mass det. time=4.5 min (814.3 - 809.7)

Volume	Invert	Avail.Storage	Storage Description		
#1	54.25'	7,948 cf	Custom Stage Data (Irregular) listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.25	80	30.0	0	0	80
55.00	540	99.0	207	207	790
56.00	4,082	256.0	2,036	2,243	5,229
57.00	7,500	400.0	5,705	7,948	12,753

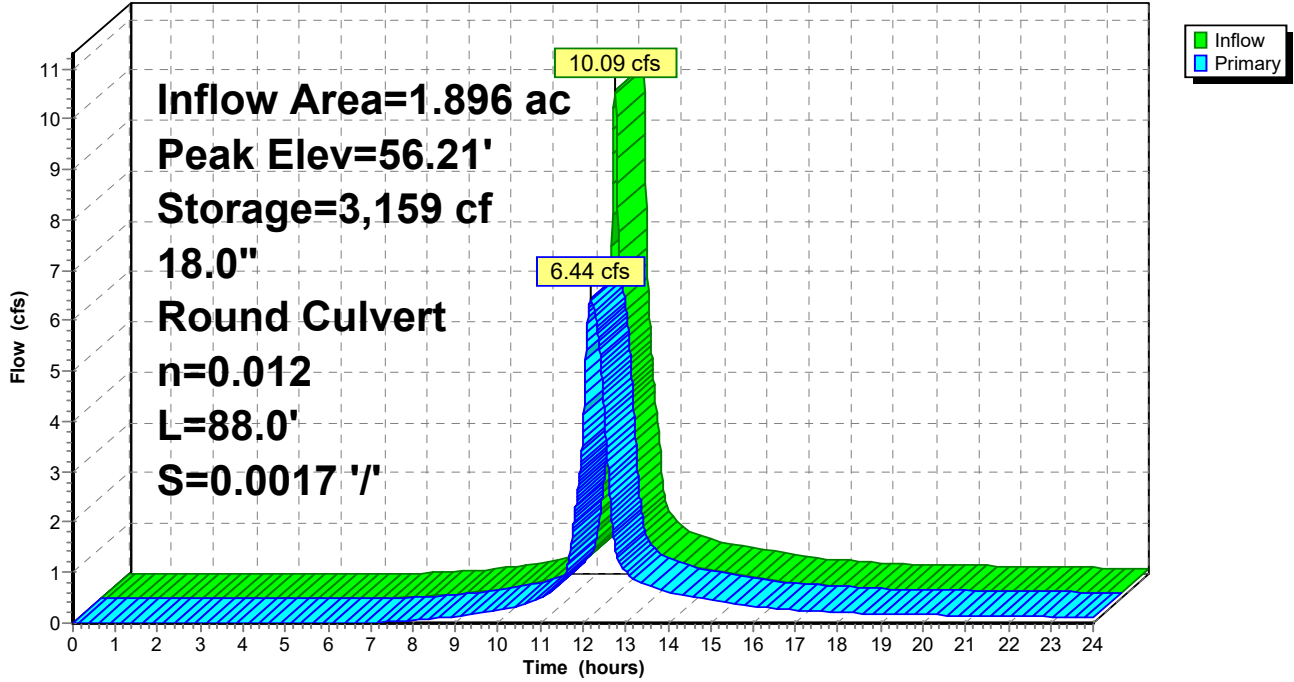
Device	Routing	Invert	Outlet Devices
#1	Primary	54.42'	18.0" Round Culvert L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 54.42' / 54.27' S= 0.0017'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=6.44 cfs @ 12.19 hrs HW=56.21' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 6.44 cfs @ 3.86 fps)

Pond 1P: 18" Culvert

Hydrograph



Saratoga Way Pre 12-1-2020

Type III 24-hr 50 yr Rainfall=8.44"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SW area

Runoff Area=82,592 sf 18.85% Impervious Runoff Depth>5.91"
Flow Length=394' Tc=6.4 min CN=79 Runoff=12.77 cfs 0.934 af

ReachAP1: AP1

Inflow=7.16 cfs 0.933 af
Outflow=7.16 cfs 0.933 af

Pond 1P: 18" Culvert

Peak Elev=56.50' Storage=4,680 cf Inflow=12.77 cfs 0.934 af
18.0" Round Culvert n=0.012 L=88.0' S=0.0017 '/' Outflow=7.16 cfs 0.933 af

Total Runoff Area = 1.896 ac Runoff Volume = 0.934 af Average Runoff Depth = 5.91"
81.15% Pervious = 1.539 ac 18.85% Impervious = 0.357 ac

Summary for Subcatchment 1S: SW area

Runoff = 12.77 cfs @ 12.09 hrs, Volume= 0.934 af, Depth> 5.91"

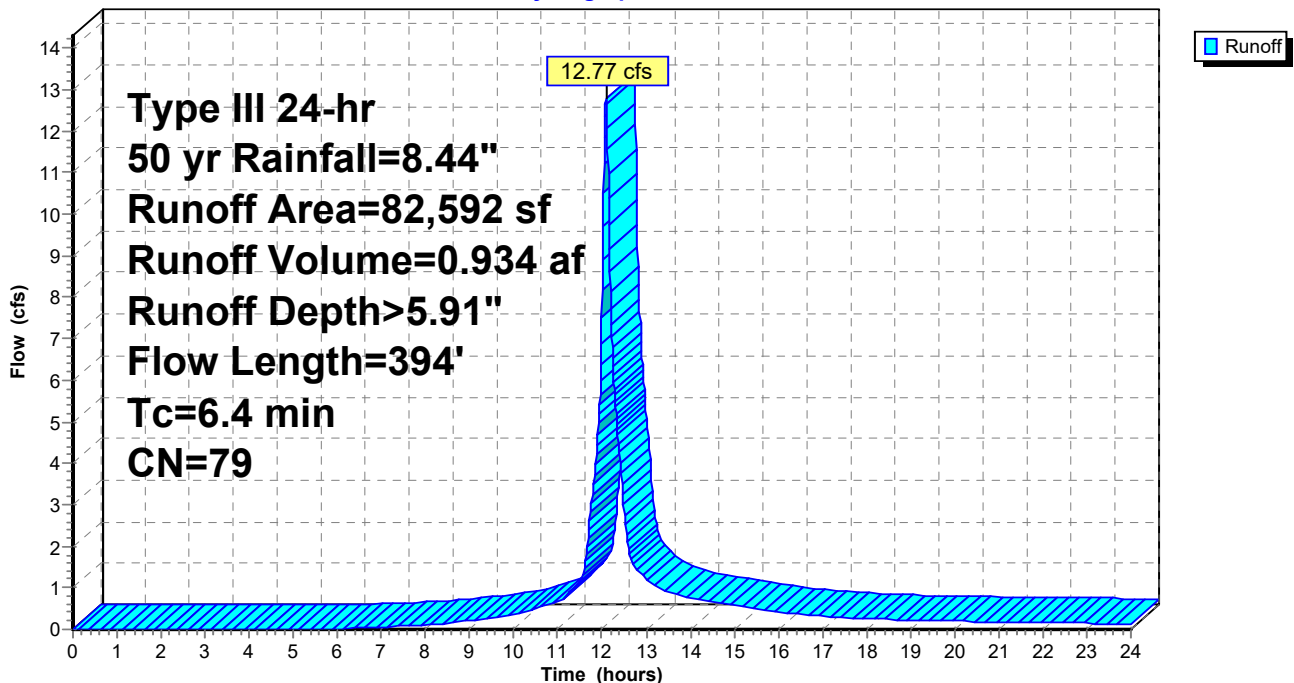
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 50 yr Rainfall=8.44"

Area (sf)	CN	Description
67,463	79	1 acre lots, 20% imp, HSG C
13,040	74	>75% Grass cover, Good, HSG C
497	98	Roofs, HSG C
15	96	Gravel surface, HSG C
1,542	98	Paved parking, HSG C
* 35	98	Retaining Wall, HSG C
82,592	79	Weighted Average
67,025		81.15% Pervious Area
15,567		18.85% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0250	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.68"
1.6	344	0.0600	3.67		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.4	394	Total			

Subcatchment 1S: SW area

Hydrograph



Summary for Reach AP1: AP1

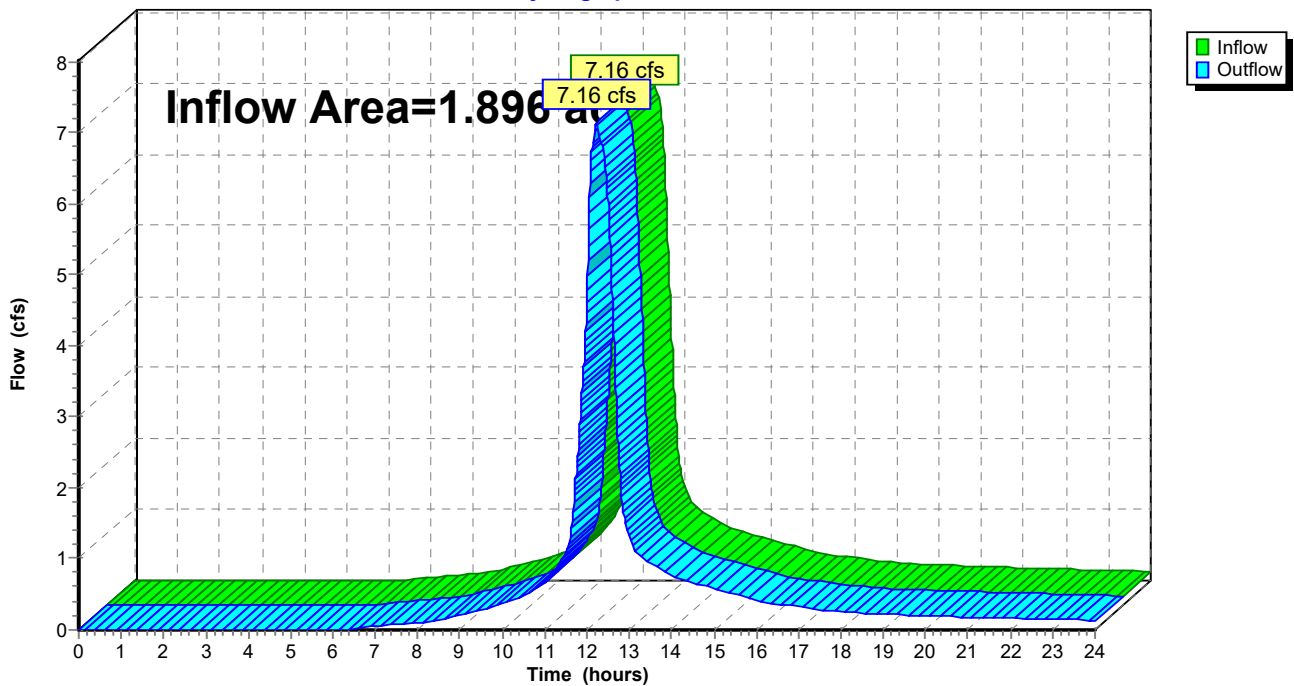
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.896 ac, 18.85% Impervious, Inflow Depth > 5.90" for 50 yr event
Inflow = 7.16 cfs @ 12.22 hrs, Volume= 0.933 af
Outflow = 7.16 cfs @ 12.22 hrs, Volume= 0.933 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Reach AP1: AP1

Hydrograph



Summary for Pond 1P: 18" Culvert

Inflow Area = 1.896 ac, 18.85% Impervious, Inflow Depth > 5.91" for 50 yr event
 Inflow = 12.77 cfs @ 12.09 hrs, Volume= 0.934 af
 Outflow = 7.16 cfs @ 12.22 hrs, Volume= 0.933 af, Atten= 44%, Lag= 7.5 min
 Primary = 7.16 cfs @ 12.22 hrs, Volume= 0.933 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 56.50' @ 12.22 hrs Surf.Area= 5,669 sf Storage= 4,680 cf

Plug-Flow detention time=6.3 min calculated for 0.932 af (100% of inflow)
 Center-of-Mass det. time=5.3 min (808.1 - 802.9)

Volume	Invert	Avail.Storage	Storage Description
#1	54.25'	7,948 cf	Custom Stage Data (Irregular) listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.25	80	30.0	0	0	80
55.00	540	99.0	207	207	790
56.00	4,082	256.0	2,036	2,243	5,229
57.00	7,500	400.0	5,705	7,948	12,753

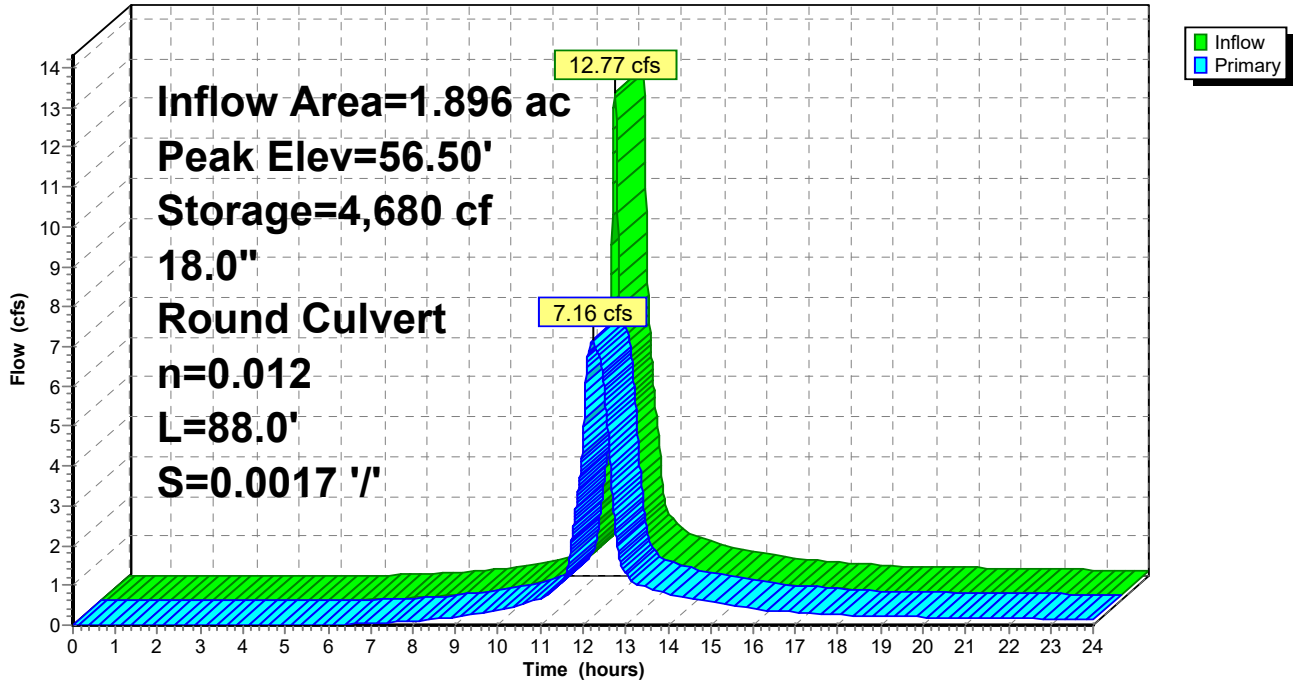
Device	Routing	Invert	Outlet Devices
#1	Primary	54.42'	18.0" Round Culvert L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 54.42' / 54.27' S= 0.0017'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=7.16 cfs @ 12.22 hrs HW=56.50' (Free Discharge)

↑ **1=Culvert** (Barrel Controls 7.16 cfs @ 4.05 fps)

Pond 1P: 18" Culvert

Hydrograph

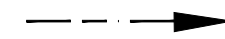


POST-DEVELOPMENT CALCULATIONS

LEGEND



SUBCATCHMENT



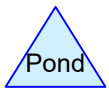
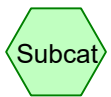
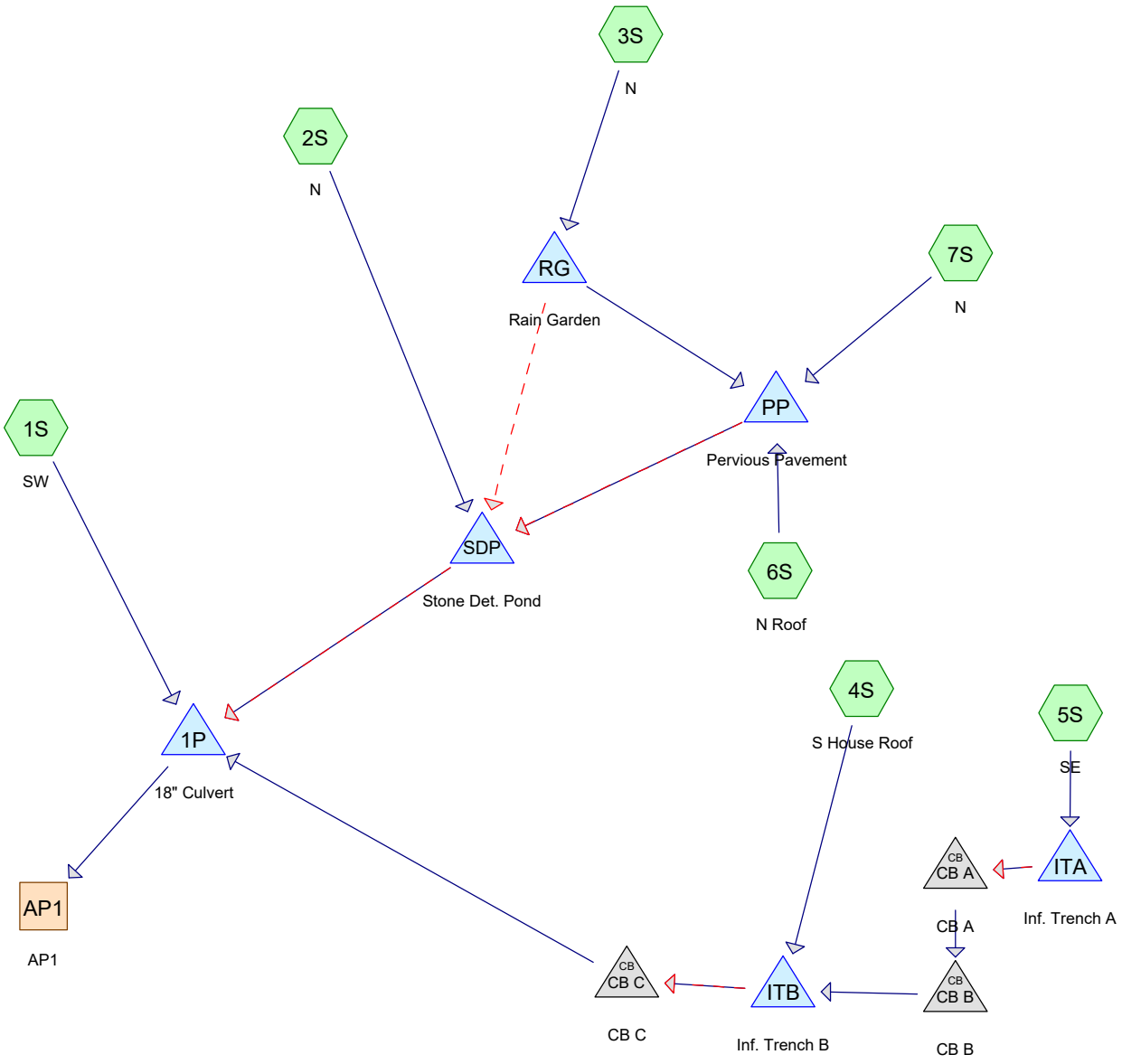
DRAINAGE FLOW PATH



ANALYSIS POINT



POST-DEVELOPMENT
SCALE: 1" = 50'



Routing Diagram for Saratoga Way Post 1-7-2021
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Saratoga Way Post 1-7-2021

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.549	79	1 acre lots, 20% imp, HSG C (1S, 2S, 3S)
0.149	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 5S, 7S)
0.003	98	Deck, HSG C (5S)
0.005	41	Infiltration Trench, HSG C (4S)
0.001	48	Infiltration Trench, HSG C (5S)
0.014	98	Paved parking, HSG C (7S)
0.062	41	Pervious Pavement, HSG C (7S)
0.002	98	Retaining Wall, HSG C (3S)
0.088	98	Roofs, HSG C (4S, 6S)
0.016	55	Stone Detention Pond, HSG C (2S)
0.005	98	deck, HSG C (1S)
0.001	98	retaining wall, HSG C (1S)
1.897	78	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
1.897	HSG C	1S, 2S, 3S, 4S, 5S, 6S, 7S
0.000	HSG D	
0.000	Other	
1.897		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	1.549	0.000	0.000	1.549	1 acre lots, 20% imp	1S, 2S, 3S
0.000	0.000	0.149	0.000	0.000	0.149	>75% Grass cover, Good	1S, 2S, 3S, 5S, 7S
0.000	0.000	0.003	0.000	0.000	0.003	Deck	5S
0.000	0.000	0.006	0.000	0.000	0.006	Infiltration Trench	4S, 5S
0.000	0.000	0.014	0.000	0.000	0.014	Paved parking	7S
0.000	0.000	0.062	0.000	0.000	0.062	Pervious Pavement	7S
0.000	0.000	0.002	0.000	0.000	0.002	Retaining Wall	3S
0.000	0.000	0.088	0.000	0.000	0.088	Roofs	4S, 6S
0.000	0.000	0.016	0.000	0.000	0.016	Stone Detention Pond	2S
0.000	0.000	0.005	0.000	0.000	0.005	deck	1S
0.000	0.000	0.001	0.000	0.000	0.001	retaining wall	1S
0.000	0.000	1.897	0.000	0.000	1.897	TOTAL AREA	

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Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	54.42	54.27	88.0	0.0017	0.012	18.0	0.0	0.0
2	CB A	57.17	57.00	16.7	0.0102	0.012	6.0	0.0	0.0
3	CB B	56.83	56.00	82.0	0.0101	0.012	6.0	0.0	0.0
4	CB C	55.90	55.70	9.0	0.0222	0.012	6.0	0.0	0.0
5	ITA	57.25	57.25	1.0	0.0000	0.012	6.0	0.0	0.0
6	ITB	56.00	56.00	1.0	0.0000	0.012	6.0	0.0	0.0
7	PP	55.00	54.85	10.0	0.0150	0.012	10.0	0.0	0.0
8	RG	55.20	55.15	5.0	0.0100	0.012	10.0	0.0	0.0
9	SDP	54.70	54.50	15.0	0.0133	0.012	15.0	0.0	0.0

Saratoga Way Post 1-7-2021

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Type III 24-hr 2 yr Rainfall=3.68"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: SW	Runoff Area=20,610 sf 18.76% Impervious Runoff Depth>1.71" Tc=5.0 min CN=79 Runoff=0.98 cfs 0.067 af
Subcatchment2S: N	Runoff Area=20,291 sf 17.84% Impervious Runoff Depth>1.63" Flow Length=278' Tc=6.1 min CN=78 Runoff=0.88 cfs 0.063 af
Subcatchment3S: N	Runoff Area=32,810 sf 19.38% Impervious Runoff Depth>1.70" Flow Length=279' Tc=5.8 min CN=79 Runoff=1.51 cfs 0.107 af
Subcatchment4S: S HouseRoof	Runoff Area=2,140 sf 89.72% Impervious Runoff Depth>2.81" Tc=5.0 min CN=92 Runoff=0.16 cfs 0.011 af
Subcatchment5S: SE	Runoff Area=1,274 sf 11.30% Impervious Runoff Depth>1.50" Tc=5.0 min CN=76 Runoff=0.05 cfs 0.004 af
Subcatchment6S: N Roof	Runoff Area=1,920 sf 100.00% Impervious Runoff Depth>3.32" Tc=200.0 min CN=98 Runoff=0.03 cfs 0.012 af
Subcatchment7S: N	Runoff Area=3,567 sf 17.33% Impervious Runoff Depth>0.30" Tc=200.0 min CN=53 Runoff=0.00 cfs 0.002 af
ReachAP1: AP1	Inflow=2.49 cfs 0.264 af Outflow=2.49 cfs 0.264 af
Pond 1P: 18" Culvert	Peak Elev=55.39' Storage=184 cf Inflow=2.51 cfs 0.265 af 18.0" Round Culvert n=0.012 L=88.0' S=0.0017 '/' Outflow=2.49 cfs 0.264 af
Pond CB A: CB A	Peak Elev=57.31' Inflow=0.05 cfs 0.004 af 6.0" Round Culvert n=0.012 L=16.7' S=0.0102 '/' Outflow=0.05 cfs 0.004 af
Pond CB B: CB B	Peak Elev=56.98' Inflow=0.05 cfs 0.004 af 6.0" Round Culvert n=0.012 L=82.0' S=0.0101 '/' Outflow=0.05 cfs 0.004 af
Pond CB C: CB C	Peak Elev=56.18' Inflow=0.21 cfs 0.015 af 6.0" Round Culvert n=0.012 L=9.0' S=0.0222 '/' Outflow=0.21 cfs 0.015 af
Pond ITA: Inf. TrenchA	Peak Elev=57.42' Storage=0.000 af Inflow=0.05 cfs 0.004 af Primary=0.05 cfs 0.004 af Secondary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.004 af
Pond ITB: Inf. TrenchB	Peak Elev=56.36' Storage=0.001 af Inflow=0.21 cfs 0.015 af Primary=0.21 cfs 0.015 af Secondary=0.00 cfs 0.000 af Outflow=0.21 cfs 0.015 af
Pond PP: PerviousPavement	Peak Elev=55.63' Storage=690 cf Inflow=1.45 cfs 0.121 af Primary=1.06 cfs 0.120 af Secondary=0.00 cfs 0.000 af Outflow=1.06 cfs 0.120 af
Pond RG: Rain Garden	Peak Elev=55.70' Storage=121 cf Inflow=1.51 cfs 0.107 af Primary=1.44 cfs 0.107 af Secondary=0.00 cfs 0.000 af Outflow=1.44 cfs 0.107 af

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Type III 24-hr 2 yr Rainfall=3.68"

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Pond SDP: Stone Det. Pond

Peak Elev=55.57' Storage=267 cf Inflow=1.65 cfs 0.183 af
Primary=1.67 cfs 0.182 af Secondary=0.00 cfs 0.000 af Outflow=1.67 cfs 0.182 af

Total Runoff Area = 1.897 ac Runoff Volume = 0.267 af Average Runoff Depth = 1.69"
77.67% Pervious = 1.473 ac 22.33% Impervious = 0.423 ac

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Type III 24-hr 2 yr Rainfall=3.68"

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Summary for Subcatchment 1S: SW

Runoff = 0.98 cfs @ 12.08 hrs, Volume= 0.067 af, Depth> 1.71"

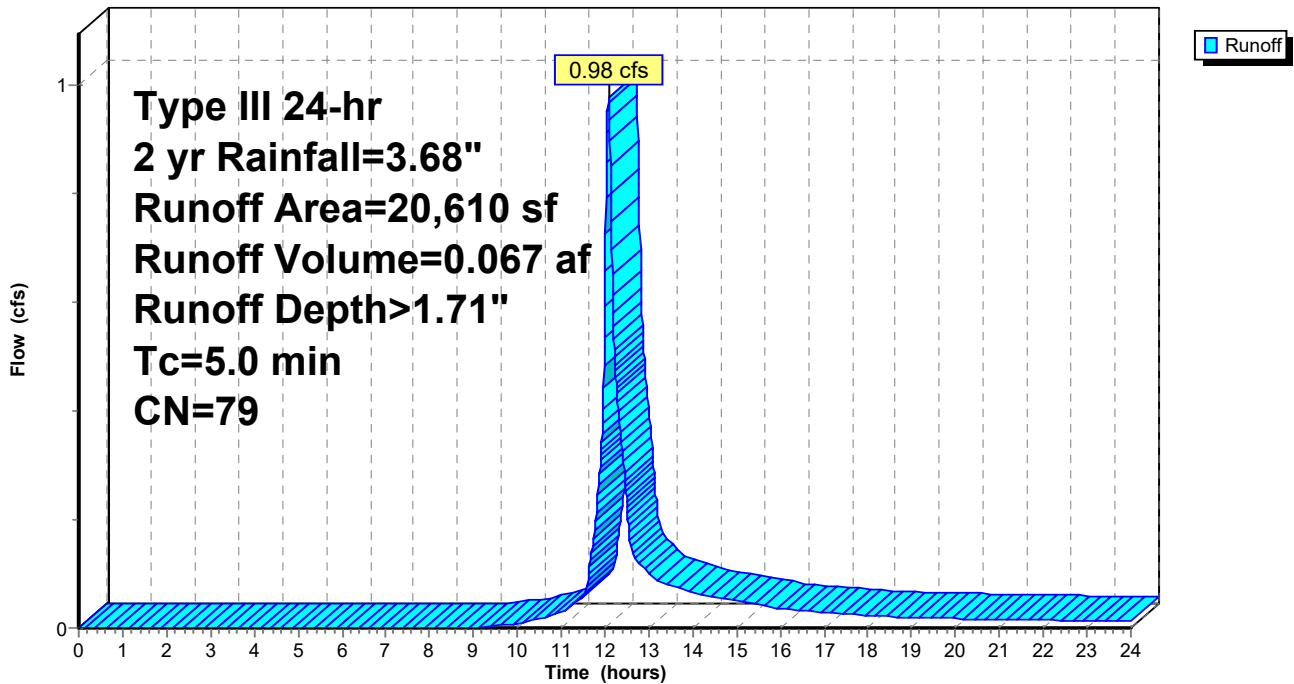
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.68"

Area (sf)	CN	Description
17,964	79	1 acre lots, 20% imp, HSG C
* 220	98	deck, HSG C
* 54	98	retaining wall, HSG C
2,372	74	>75% Grass cover, Good, HSG C
20,610	79	Weighted Average
16,743		81.24% Pervious Area
3,867		18.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 1S: SW

Hydrograph



Saratoga Way Post 1-7-2021

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Type III 24-hr 2 yr Rainfall=3.68"

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Summary for Subcatchment 2S: N

Runoff = 0.88 cfs @ 12.09 hrs, Volume= 0.063 af, Depth> 1.63"

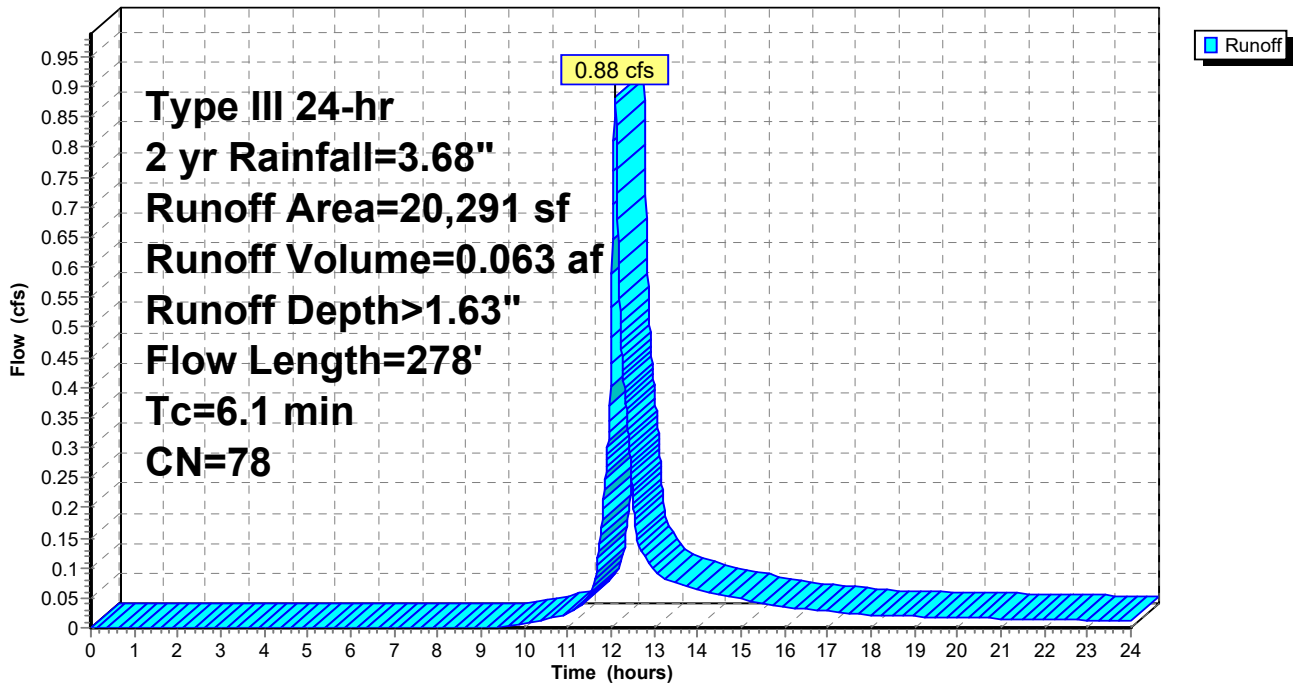
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.68"

Area (sf)	CN	Description
18,097	79	1 acre lots, 20% imp, HSG C
1,486	74	>75% Grass cover, Good, HSG C
* 708	55	Stone Detention Pond, HSG C
20,291	78	Weighted Average
16,672		82.16% Pervious Area
3,619		17.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	50	0.0200	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.68"
0.9	228	0.0750	4.11		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.1	278	Total			

Subcatchment 2S: N

Hydrograph



Saratoga Way Post 1-7-2021

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Type III 24-hr 2 yr Rainfall=3.68"

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Summary for Subcatchment 3S: N

Runoff = 1.51 cfs @ 12.09 hrs, Volume= 0.107 af, Depth> 1.70"

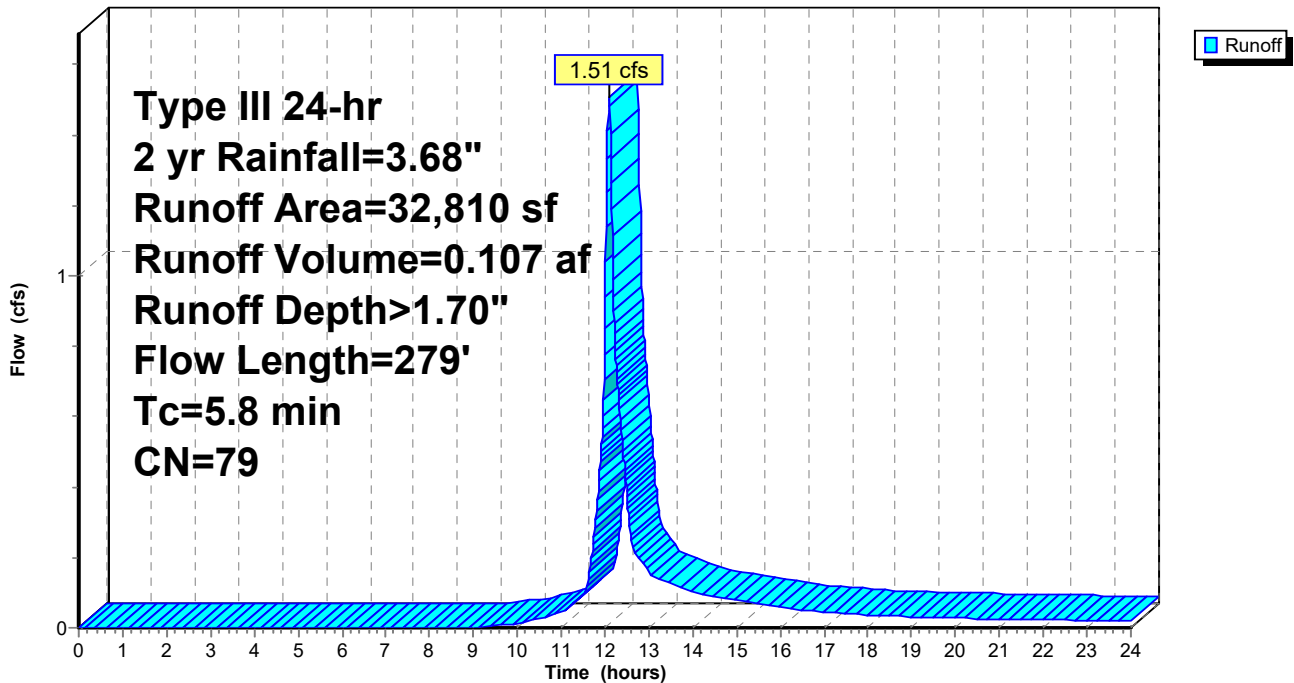
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.68"

Area (sf)	CN	Description
31,402	79	1 acre lots, 20% imp, HSG C
1,329	74	>75% Grass cover, Good, HSG C
* 79	98	Retaining Wall, HSG C
32,810	79	Weighted Average
26,451		80.62% Pervious Area
6,359		19.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0250	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.68"
1.0	229	0.0600	3.67		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
5.8	279	Total			

Subcatchment 3S: N

Hydrograph



Summary for Subcatchment 4S: S House Roof

Runoff = 0.16 cfs @ 12.07 hrs, Volume= 0.011 af, Depth> 2.81"

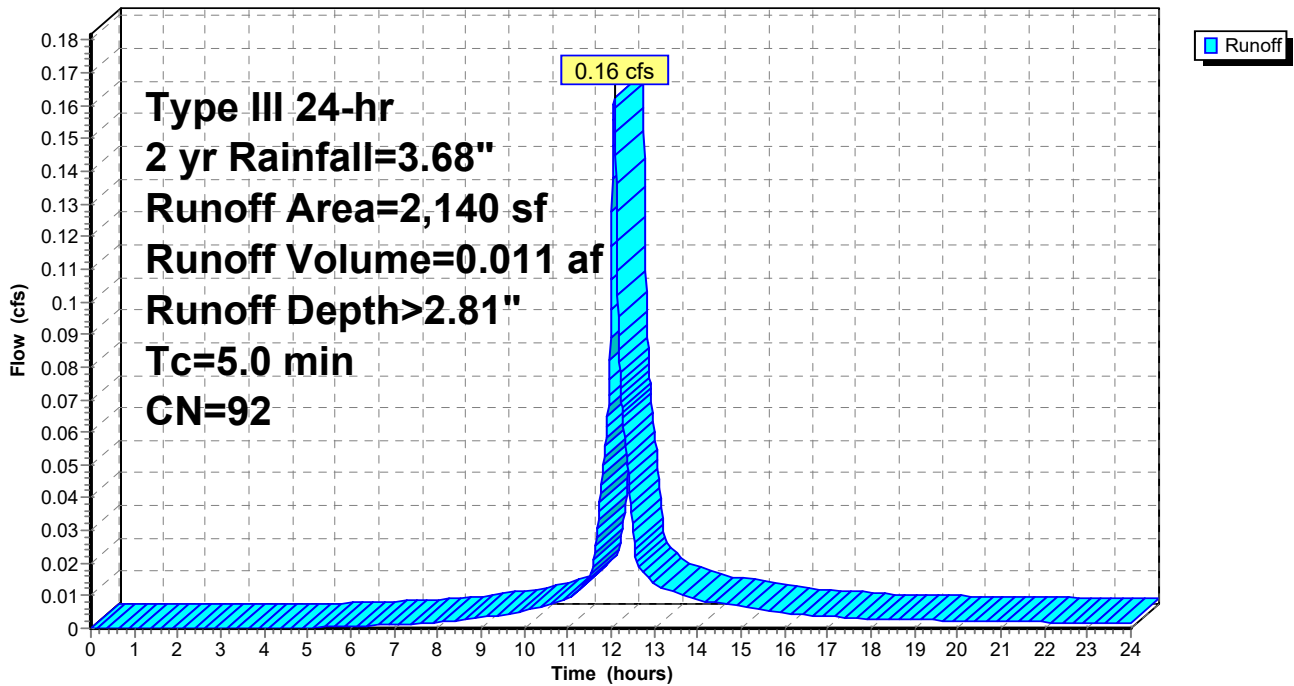
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2 yr Rainfall=3.68"

Area (sf)	CN	Description
1,920	98	Roofs, HSG C
* 220	41	Infiltration Trench, HSG C
2,140	92	Weighted Average
220		10.28% Pervious Area
1,920		89.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 4S: S House Roof

Hydrograph



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Type III 24-hr 2 yr Rainfall=3.68"

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Summary for Subcatchment 5S: SE

Runoff = 0.05 cfs @ 12.08 hrs, Volume= 0.004 af, Depth> 1.50"

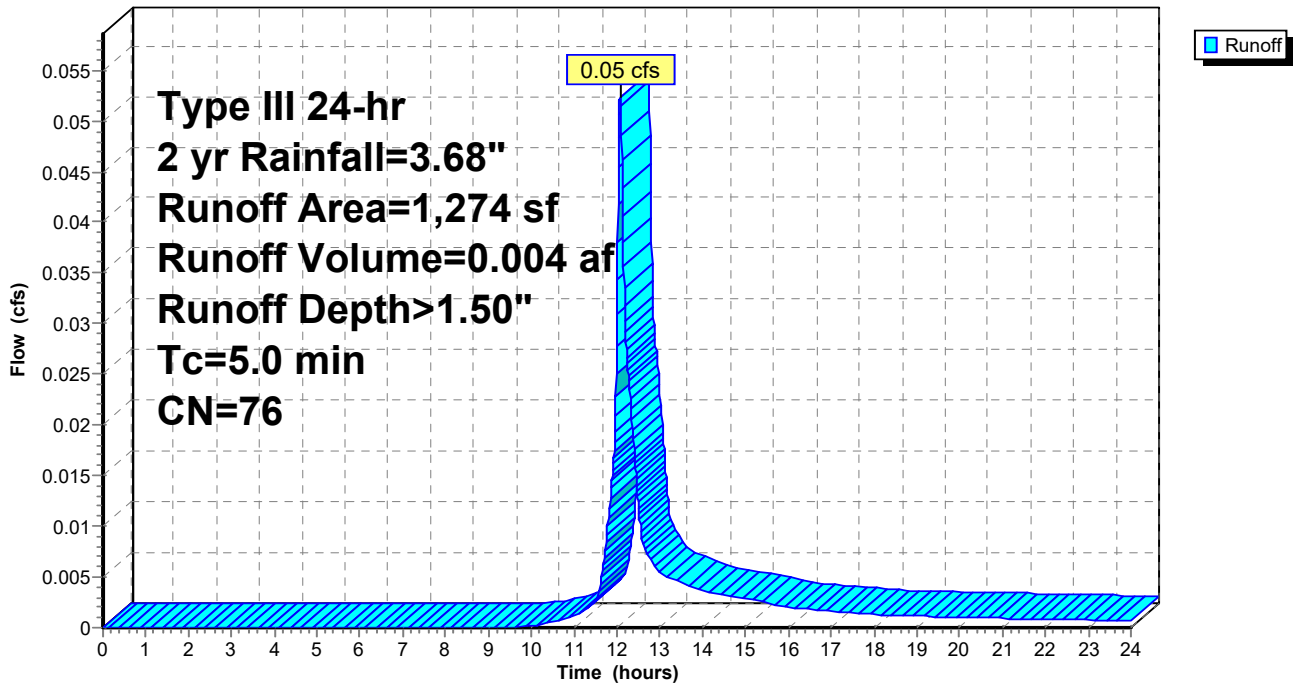
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2 yr Rainfall=3.68"

Area (sf)	CN	Description
1,082	74	>75% Grass cover, Good, HSG C
* 144	98	Deck, HSG C
* 48	48	Infiltration Trench, HSG C
1,274	76	Weighted Average
1,130		88.70% Pervious Area
144		11.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5S: SE

Hydrograph



Summary for Subcatchment 6S: N Roof

Runoff = 0.03 cfs @ 14.45 hrs, Volume= 0.012 af, Depth> 3.32"

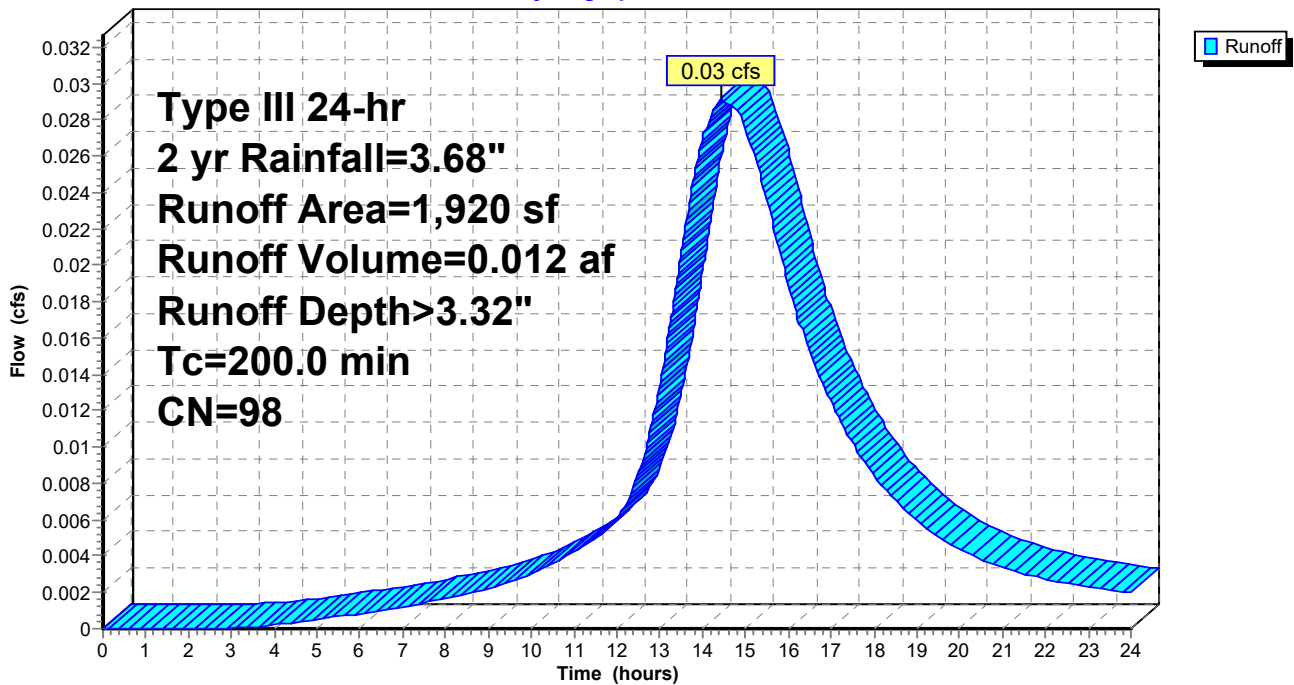
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2 yr Rainfall=3.68"

Area (sf)	CN	Description
1,920	98	Roofs, HSG C
1,920		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
200.0					Direct Entry,

Subcatchment 6S: N Roof

Hydrograph



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Type III 24-hr 2 yr Rainfall=3.68"

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Summary for Subcatchment 7S: N

Runoff = 0.00 cfs @ 15.77 hrs, Volume= 0.002 af, Depth> 0.30"

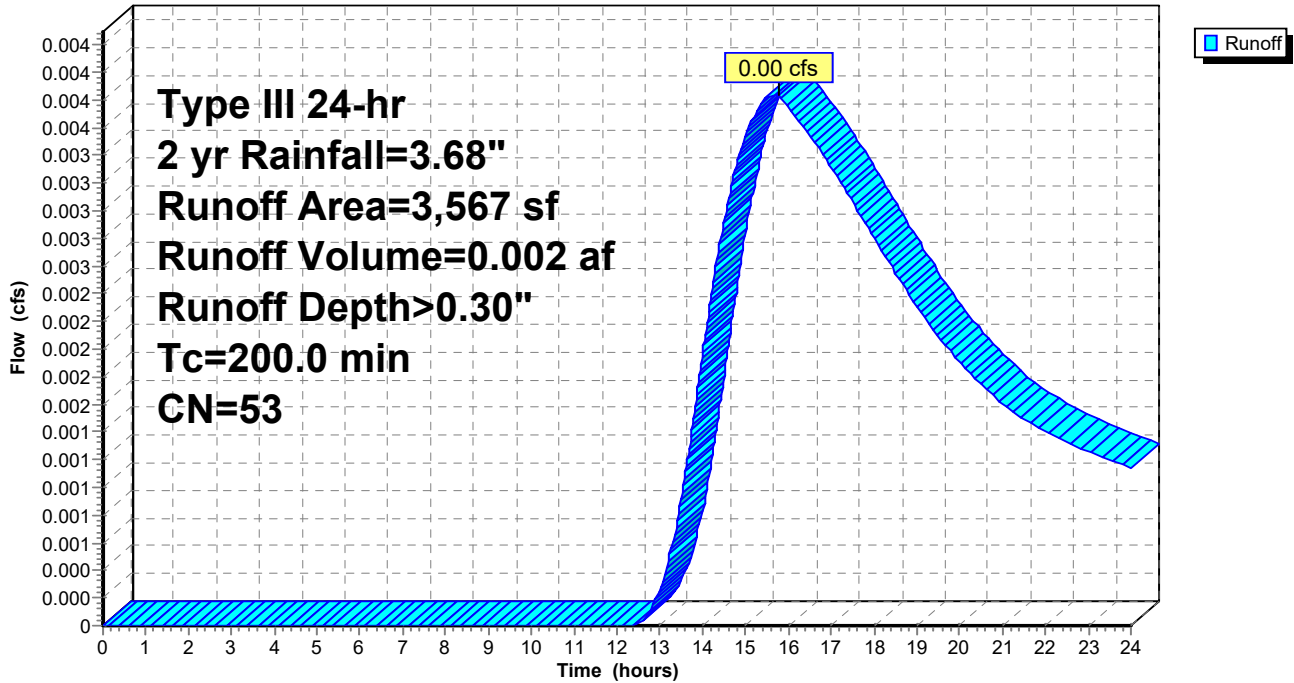
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 2 yr Rainfall=3.68"

Area (sf)	CN	Description
618	98	Paved parking, HSG C
231	74	>75% Grass cover, Good, HSG C
* 2,718	41	Pervious Pavement, HSG C
3,567	53	Weighted Average
2,949		82.67% Pervious Area
618		17.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
200.0					Direct Entry,

Subcatchment 7S: N

Hydrograph



Summary for Reach AP1: AP1

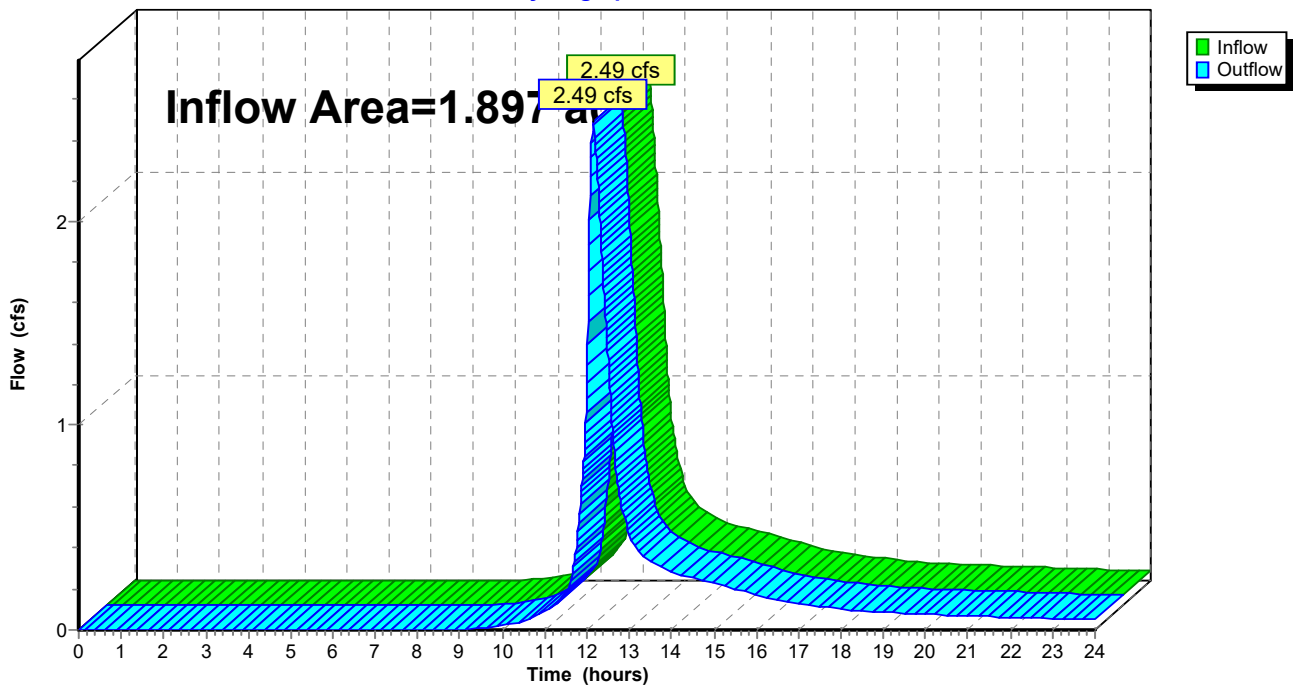
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.897 ac, 22.33% Impervious, Inflow Depth > 1.67" for 2 yr event
Inflow = 2.49 cfs @ 12.15 hrs, Volume= 0.264 af
Outflow = 2.49 cfs @ 12.15 hrs, Volume= 0.264 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Reach AP1: AP1

Hydrograph



Saratoga Way Post 1-7-2021

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Type III 24-hr 2 yr Rainfall=3.68"

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Summary for Pond 1P: 18" Culvert

Inflow Area = 1.897 ac, 22.33% Impervious, Inflow Depth > 1.68" for 2 yr event
 Inflow = 2.51 cfs @ 12.13 hrs, Volume= 0.265 af
 Outflow = 2.49 cfs @ 12.15 hrs, Volume= 0.264 af, Atten= 1%, Lag= 1.2 min
 Primary = 2.49 cfs @ 12.15 hrs, Volume= 0.264 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 55.39' @ 12.15 hrs Surf.Area= 300 sf Storage= 184 cf

Plug-Flow detention time=2.2 min calculated for 0.264 af (100% of inflow)
 Center-of-Mass det. time=1.4 min (852.7 - 851.2)

Volume	Invert	Avail.Storage	Storage Description		
#1	54.25'	957 cf	Custom Stage Data (Irregular) listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.25	20	20.0	0	0	20
55.00	235	90.0	81	81	634
56.00	420	115.0	323	404	1,055
57.00	698	147.0	553	957	1,735

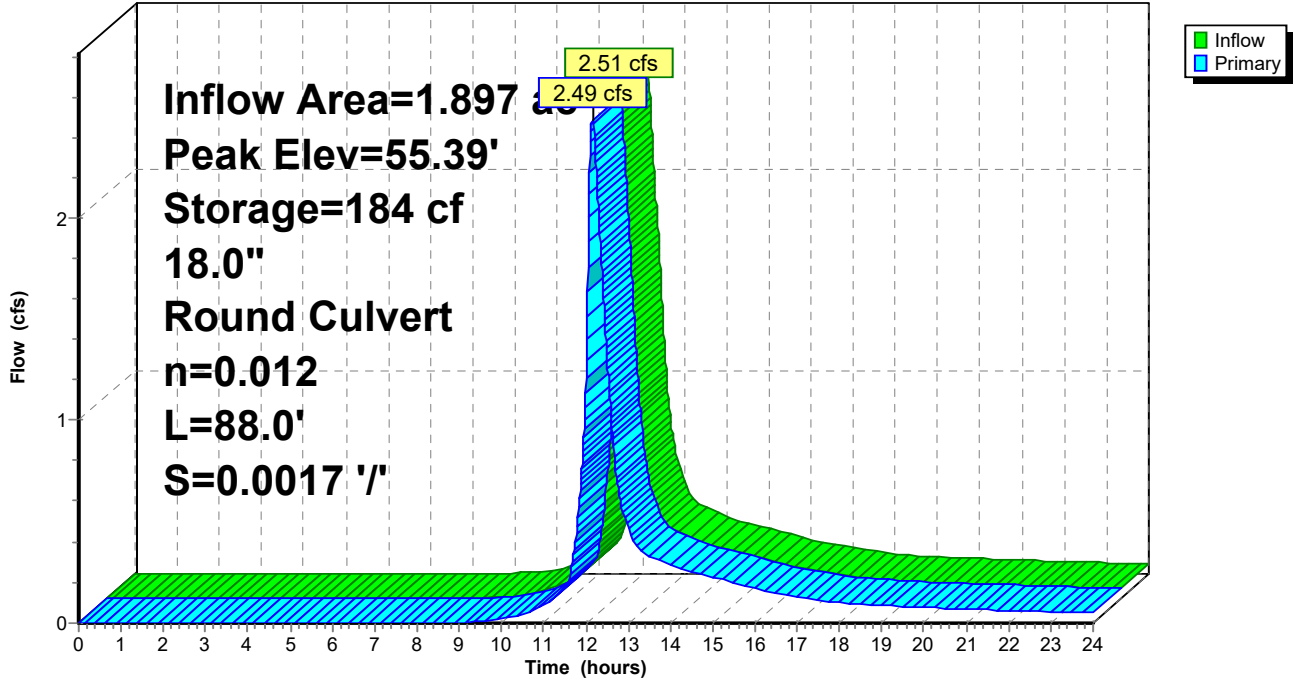
Device	Routing	Invert	Outlet Devices
#1	Primary	54.42'	18.0" Round Culvert L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 54.42' / 54.27' S= 0.0017'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.49 cfs @ 12.15 hrs HW=55.39' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Barrel Controls 2.49 cfs @ 2.94 fps)

Pond 1P: 18" Culvert

Hydrograph



Summary for Pond CB A: CB A

[57] Hint: Peaked at 57.31' (Flood elevation advised)

Inflow Area = 0.029 ac, 11.30% Impervious, Inflow Depth > 1.49" for 2 yr event
 Inflow = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af
 Outflow = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af

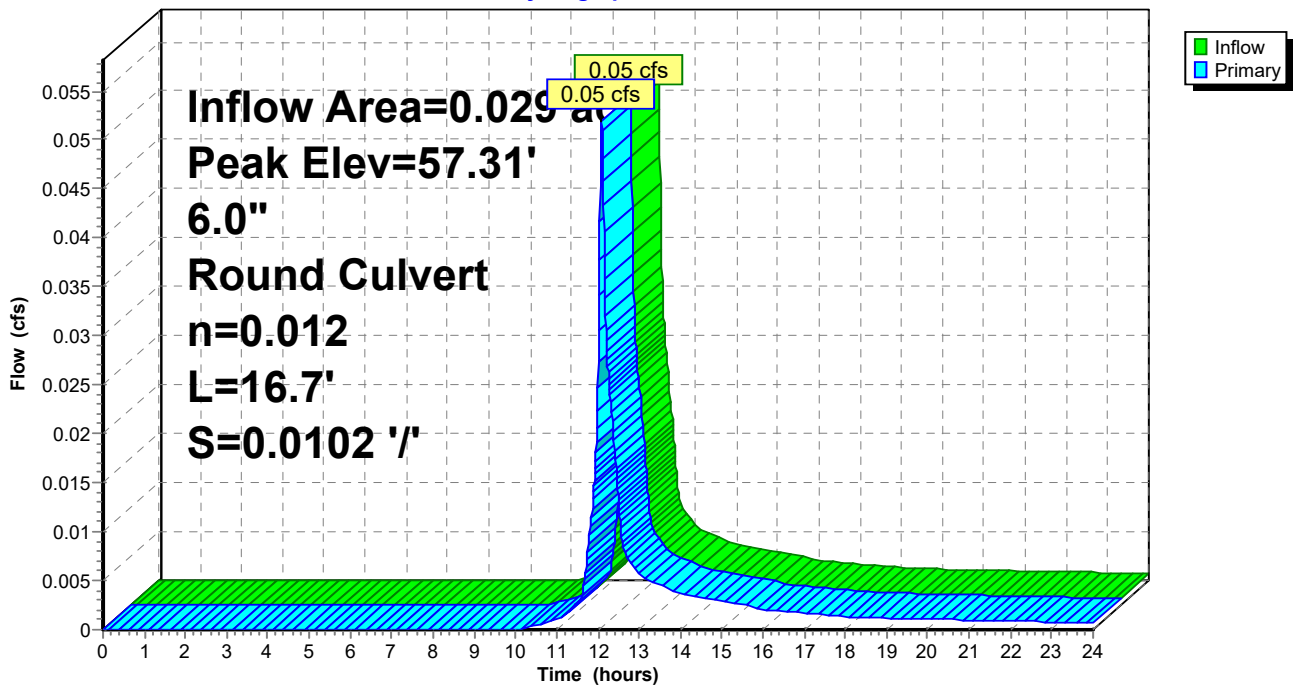
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 57.31'@ 12.09 hrs

Device #	Routing	Invert	Outlet Devices
1	Primary	57.17'	6.0" Round Culvert L= 16.7' Ke= 0.500 Inlet / Outlet Invert= 57.17' / 57.00' S= 0.0102'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.05 cfs @ 12.09 hrs HW=57.31' TW=56.98' (Dynamic Tailwater)
 ↑ 1=Culvert (Barrel Controls 0.05 cfs @ 1.75 fps)

Pond CB A: CB A

Hydrograph



Summary for Pond CB B: CB B

[57] Hint: Peaked at 56.98' (Flood elevation advised)

Inflow Area = 0.029 ac, 11.30% Impervious, Inflow Depth > 1.49" for 2 yr event
 Inflow = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af
 Outflow = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af

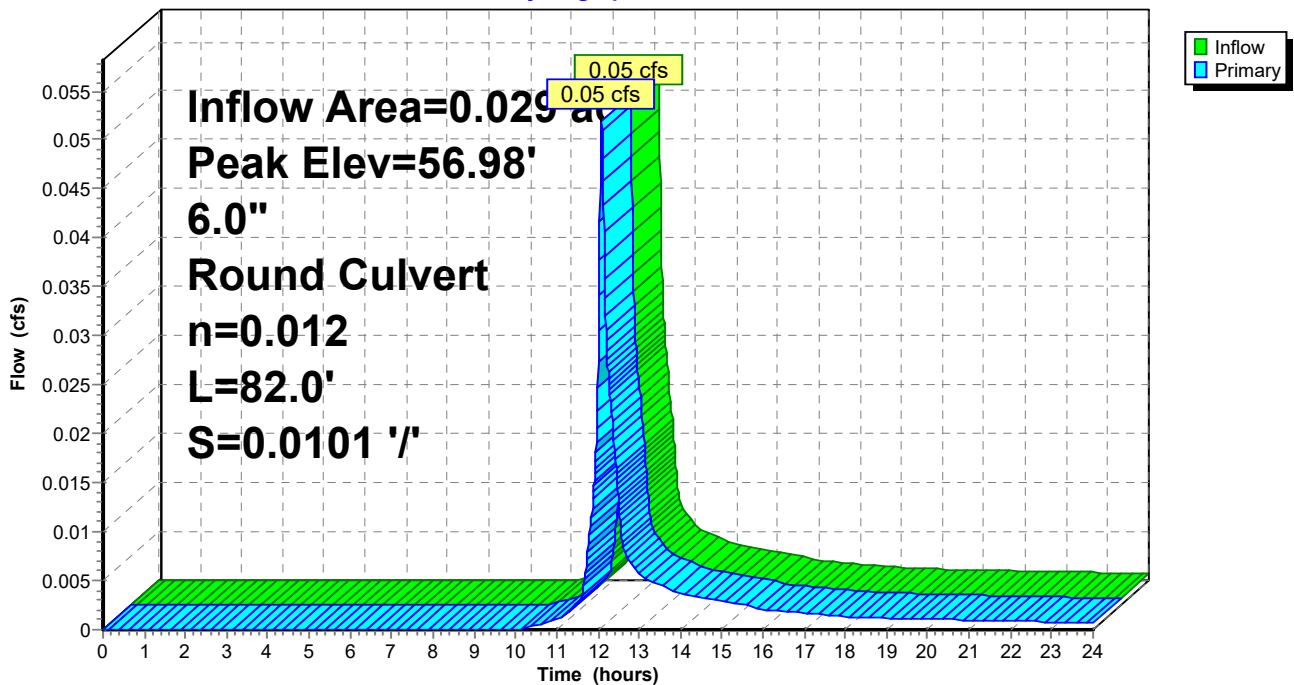
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.98'@ 12.09 hrs

Device #	Routing	Invert	Outlet Devices
1	Primary	56.83'	6.0" Round Culvert L= 82.0' Ke= 0.500 Inlet / Outlet Invert= 56.83' / 56.00' S= 0.0101 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.05 cfs @ 12.09 hrs HW=56.98' TW=56.36' (Dynamic Tailwater)
 ↑ **1=Culvert** (Outlet Controls 0.05 cfs @ 1.64 fps)

Pond CB B: CB B

Hydrograph



Summary for Pond CB C: CB C

[57] Hint: Peaked at 56.18' (Flood elevation advised)

Inflow Area = 0.078 ac, 60.46% Impervious, Inflow Depth > 2.31" for 2 yr event
 Inflow = 0.21 cfs @ 12.09 hrs, Volume= 0.015 af
 Outflow = 0.21 cfs @ 12.09 hrs, Volume= 0.015 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.21 cfs @ 12.09 hrs, Volume= 0.015 af

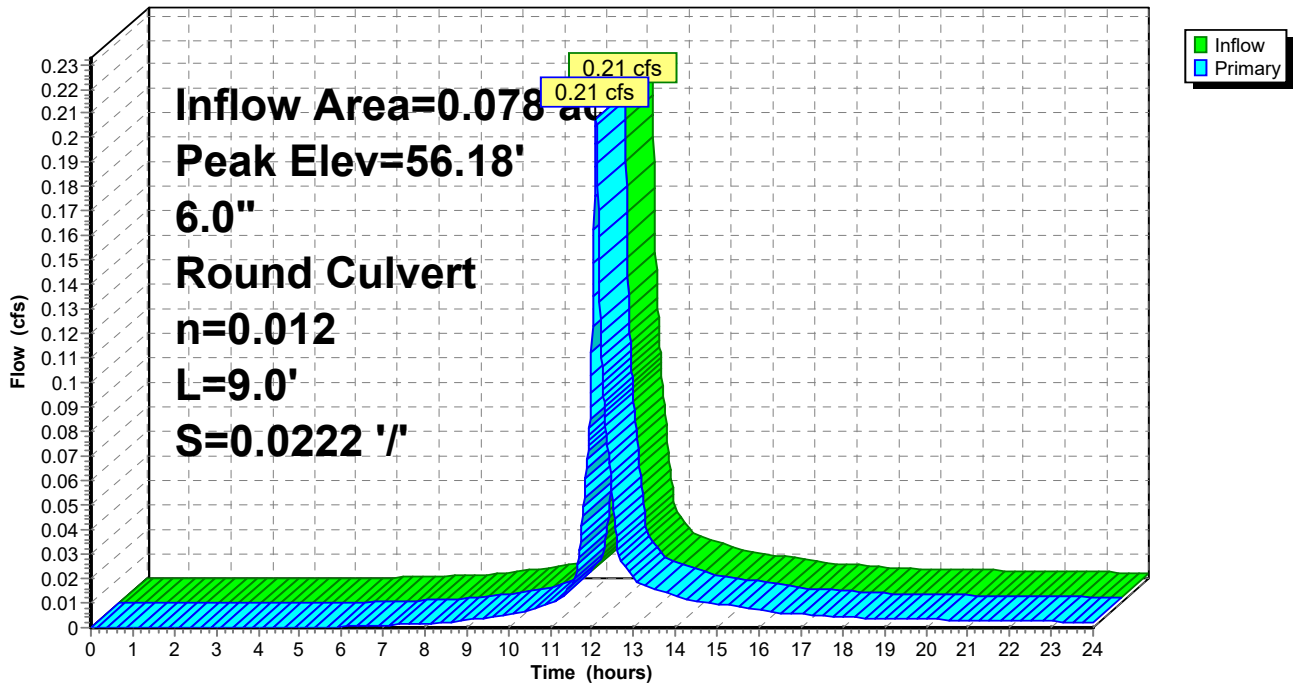
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.18'@ 12.09 hrs

Device #	Routing	Invert	Outlet Devices
1	Primary	55.90'	6.0" Round Culvert L= 9.0' Ke= 0.500 Inlet / Outlet Invert= 55.90' / 55.70' S= 0.0222'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.21 cfs @ 12.09 hrs HW=56.18' TW=55.34' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 0.21 cfs @ 1.81 fps)

Pond CB C: CB C

Hydrograph



Summary for Pond ITA: Inf. Trench A

Inflow Area = 0.029 ac, 11.30% Impervious, Inflow Depth > 1.50" for 2 yr event
 Inflow = 0.05 cfs @ 12.08 hrs, Volume= 0.004 af
 Outflow = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af, Atten= 1%, Lag= 0.6 min
 Primary = 0.05 cfs @ 12.09 hrs, Volume= 0.004 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 57.42'@ 12.09 hrs Surf.Area= 0.001 ac Storage= 0.000 af

Plug-Flow detention time=3.8 min calculated for 0.004 af (100% of inflow)
 Center-of-Mass det. time=2.2 min (848.3 - 846.1)

Volume	Invert	Avail.Storage	Storage Description
#1	57.25'	0.001 af	2.00'W x 24.00'L x 3.25'H Prisma 0.004 af Overall x 40.0% Voids

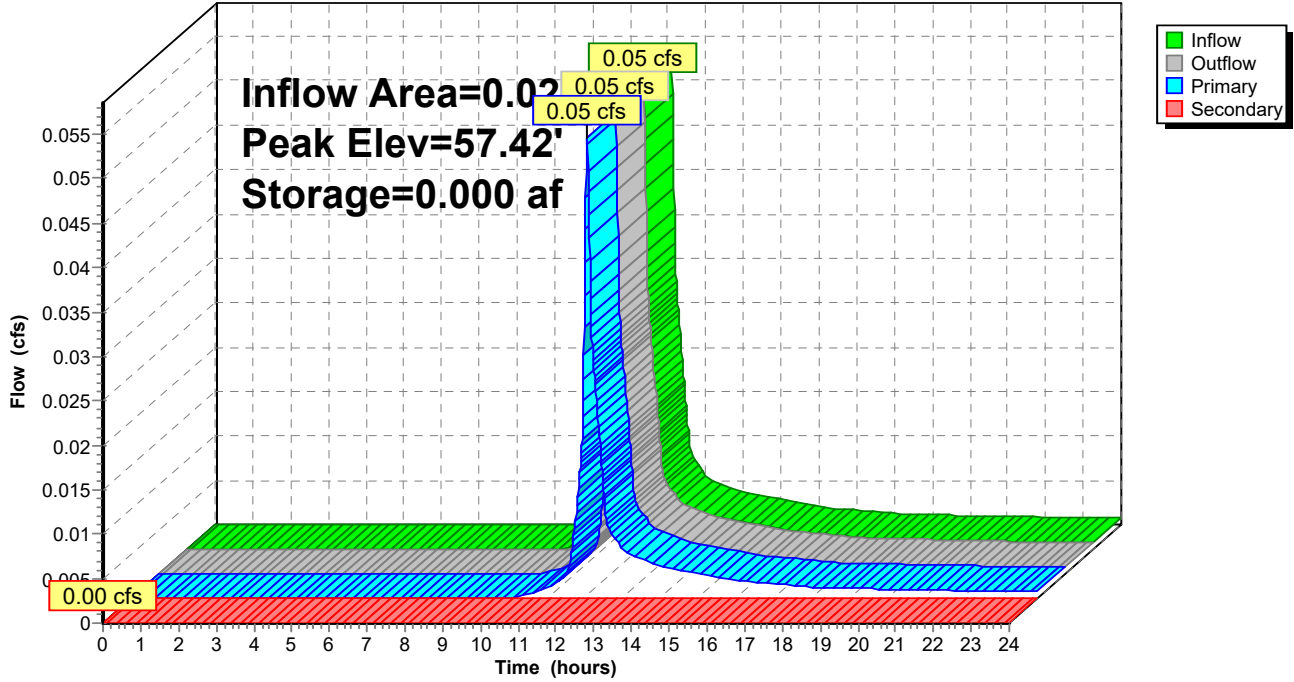
Device	Routing	Invert	Outlet Devices
#1	Primary	57.25'	6.0" Round Culvert L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 57.25' / 57.25' S= 0.0000'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	59.40'	24.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlowMax=0.05 cfs @ 12.09 hrs HW=57.42' TW=57.31' (Dynamic Tailwater)
 ↑1=Culvert (Barrel Controls 0.05 cfs @ 1.30 fps)

Secondary OutFlowMax=0.00 cfs @ 0.00 hrs HW=57.25' TW=57.17' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond ITA: Inf. Trench A

Hydrograph



Summary for Pond ITB: Inf. Trench B

Inflow Area = 0.078 ac, 60.46% Impervious, Inflow Depth > 2.32" for 2 yr event
 Inflow = 0.21 cfs @ 12.08 hrs, Volume= 0.015 af
 Outflow = 0.21 cfs @ 12.09 hrs, Volume= 0.015 af, Atten= 3%, Lag= 1.1 min
 Primary = 0.21 cfs @ 12.09 hrs, Volume= 0.015 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.36' @ 12.09 hrs Surf.Area= 0.004 ac Storage= 0.001 af

Plug-Flow detention time=6.8 min calculated for 0.015 af (100% of inflow)
 Center-of-Mass det. time=4.5 min (809.5 - 805.1)

Volume	Invert	Avail.Storage	Storage Description
#1	56.00'	0.005 af	2.00'W x 82.00'L x 3.00'H Prismaoid 0.011 af Overall x 40.0% Voids

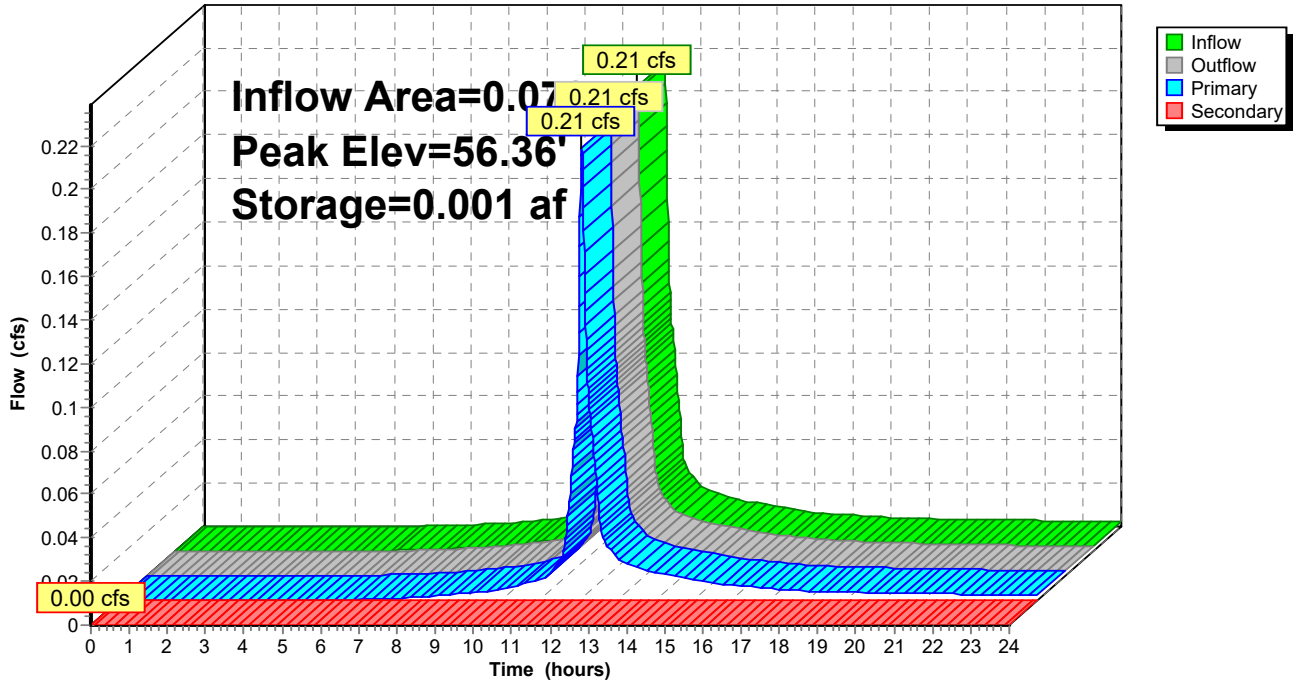
Device	Routing	Invert	Outlet Devices
#1	Primary	56.00'	6.0" Round Culvert L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 56.00' / 56.00' S= 0.0000' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	58.90'	96.5' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.21 cfs @ 12.09 hrs HW=56.36' TW=56.18' (Dynamic Tailwater)
 ↑1=Culvert (Barrel Controls 0.21 cfs @ 1.92 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=56.00' TW=55.90' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond ITB: Inf. Trench B

Hydrograph



Saratoga Way Post 1-7-2021

Prepared by Ross Engineering

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Type III 24-hr 2 yr Rainfall=3.68"

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Summary for Pond PP: Pervious Pavement

Inflow Area = 0.879 ac, 23.23% Impervious, Inflow Depth > 1.65" for 2 yr event
 Inflow = 1.45 cfs @ 12.08 hrs, Volume= 0.121 af
 Outflow = 1.06 cfs @ 12.21 hrs, Volume= 0.120 af, Atten= 26%, Lag= 7.8 min
 Primary = 1.06 cfs @ 12.21 hrs, Volume= 0.120 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 55.63'@ 12.18 hrs Surf.Area= 2,718 sf Storage= 690 cf

Plug-Flow detention time=19.0 min calculated for 0.120 af (99% of inflow)
 Center-of-Mass det. time=12.7 min (864.0 - 851.3)

Volume	Invert	Avail.Storage	Storage Description
#1	55.00'	2,147 cf	Custom Stage Data (Prismatic) listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.00	2,718	0.0	0	0
55.01	2,718	40.0	11	11
56.42	2,718	40.0	1,533	1,544
56.43	2,718	15.0	4	1,548
56.67	2,718	15.0	98	1,646
56.68	2,718	5.0	1	1,647
57.33	2,718	5.0	88	1,735
57.34	2,718	30.0	8	1,744
57.67	2,718	30.0	269	2,013
57.68	2,718	15.0	4	2,017
58.00	2,718	15.0	130	2,147

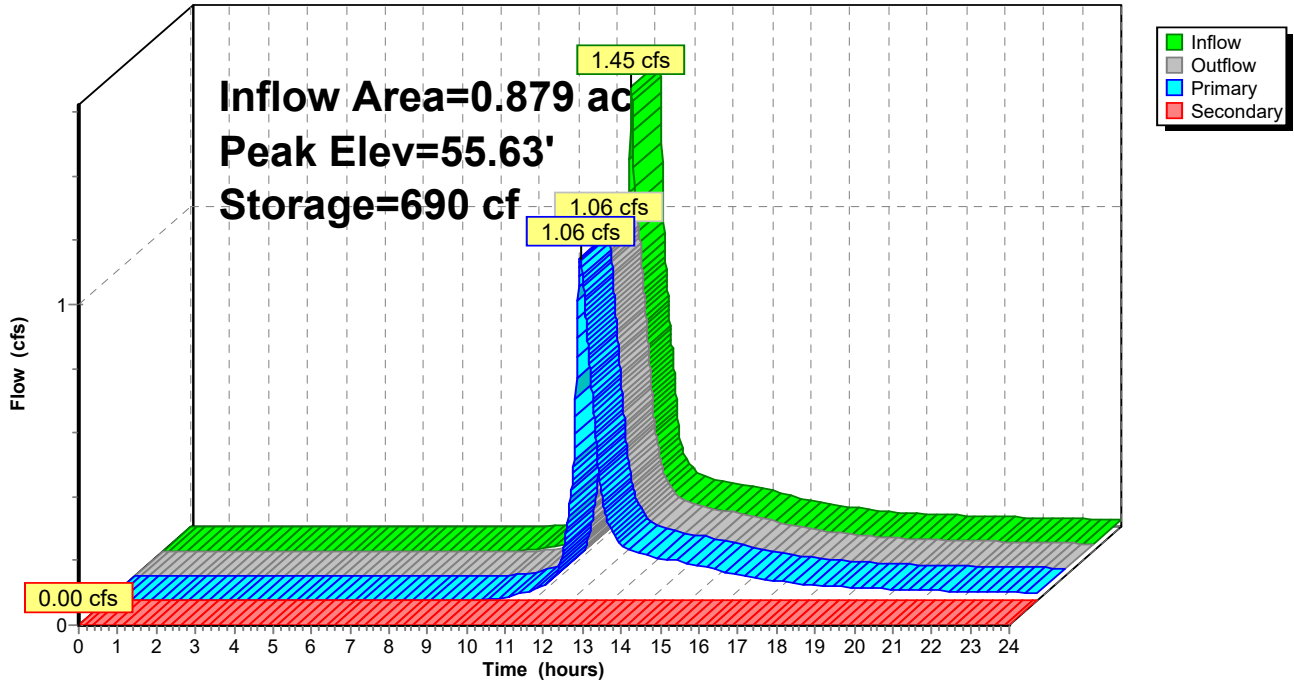
Device	Routing	Invert	Outlet Devices
#1	Primary	55.00'	10.0" Round Culvert X 2.00L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 55.00' / 54.85' S= 0.0150 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.55 sf
#2	Secondary	57.90'	20.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=1.06 cfs @ 12.21 hrs HW=55.63' TW=55.55' (Dynamic Tailwater)
 ↑1=Culvert (Outlet Controls 1.06 cfs @ 1.68 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=55.00' TW=54.69' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PP: Pervious Pavement

Hydrograph



Saratoga Way Post 1-7-2021

Type III 24-hr 2 yr Rainfall=3.68"

Prepared by Ross Engineering

Printed 1/7/2021

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Summary for Pond RG: Rain Garden

Inflow Area = 0.753 ac, 19.38% Impervious, Inflow Depth > 1.70" for 2 yr event
 Inflow = 1.51 cfs @ 12.09 hrs, Volume= 0.107 af
 Outflow = 1.44 cfs @ 12.08 hrs, Volume= 0.107 af, Atten= 5%, Lag= 0.0 min
 Primary = 1.44 cfs @ 12.08 hrs, Volume= 0.107 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 55.70' @ 12.15 hrs Surf.Area= 607 sf Storage= 121 cf

Plug-Flow detention time=3.8 min calculated for 0.107 af (100% of inflow)
 Center-of-Mass det. time=2.4 min (840.3 - 837.9)

Volume	Invert	Avail.Storage	Storage Description			
#1	55.20'	811 cf	Custom Stage Data (Conid) listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
55.20	607	0.0	0	0	607	
55.21	607	40.0	2	2	608	
56.50	607	40.0	313	316	721	
56.51	400	100.0	5	321	928	
57.00	607	100.0	245	566	1,138	
57.35	800	100.0	245	811	1,334	

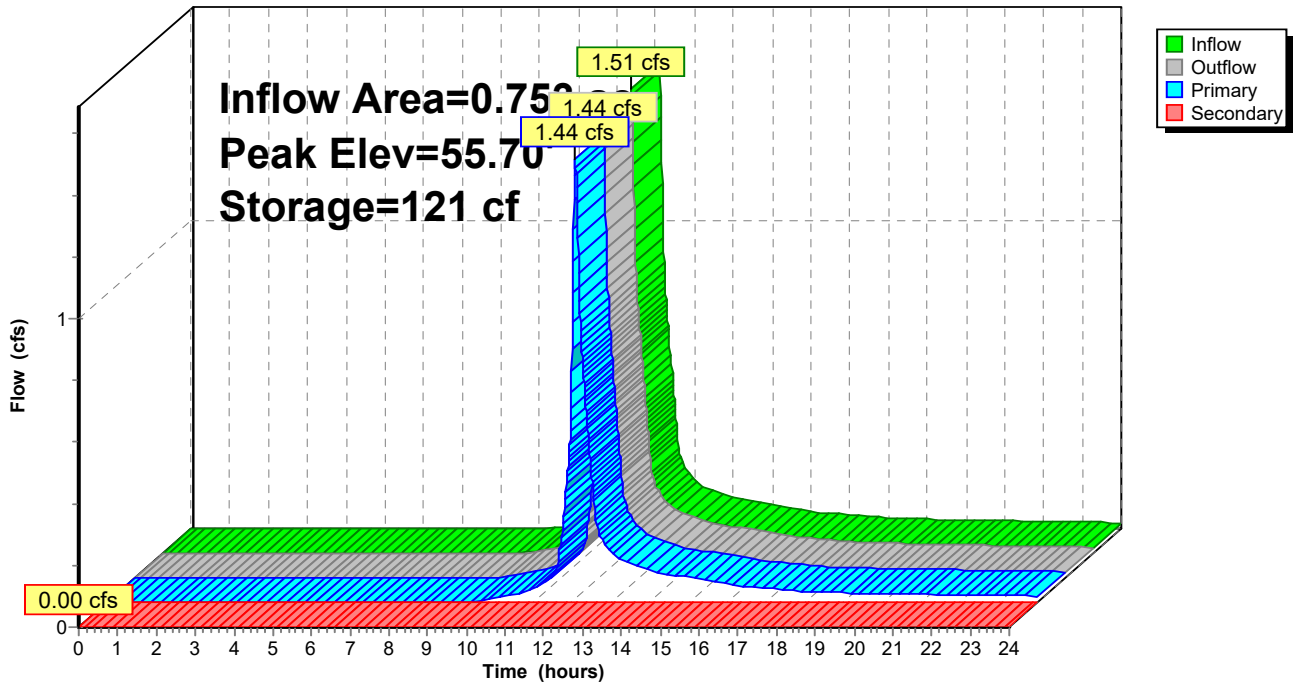
Device	Routing	Invert	Outlet Devices											
#1	Secondary	56.90'	8.0' long x 2.0' breadth Broad-Crested Rectangular Weir											
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50											
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32											
#2	Primary	55.20'	10.0" Round Culvert X 3.00L= 5.0' Ke= 0.500											
			Inlet / Outlet Invert= 55.20' / 55.15' S= 0.0100'/' Cc= 0.900											
			n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.55 sf											

Primary OutFlow Max=1.44 cfs @ 12.08 hrs HW=55.64' TW=55.48' (Dynamic Tailwater)
 ↑2=Culvert (Outlet Controls 1.44 cfs @ 2.41 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=55.20' TW=54.69' (Dynamic Tailwater)
 ↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond RG: Rain Garden

Hydrograph



Saratoga Way Post 1-7-2021

Prepared by Ross Engineering

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Type III 24-hr 2 yr Rainfall=3.68"

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Summary for Pond SDP: Stone Det. Pond

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.345 ac, 21.36% Impervious, Inflow Depth > 1.63" for 2 yr event
 Inflow = 1.65 cfs @ 12.16 hrs, Volume= 0.183 af
 Outflow = 1.67 cfs @ 12.18 hrs, Volume= 0.182 af, Atten= 0%, Lag= 1.6 min
 Primary = 1.67 cfs @ 12.18 hrs, Volume= 0.182 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 55.57'@ 12.17 hrs Surf.Area= 767 sf Storage= 267 cf

Plug-Flow detention time=5.8 min calculated for 0.182 af (100% of inflow)
 Center-of-Mass det. time=3.8 min (859.8 - 856.1)

Volume	Invert	Avail.Storage	Storage Description
#1	54.69'	2,499 cf	Custom Stage Data (Prismatic) listed below
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet) Cum.Store (cubic-feet)
54.69	1	0.0	0 0
54.70	767	40.0	2 2
56.50	767	40.0	552 554
56.51	767	100.0	8 561
57.00	1,140	100.0	467 1,029
58.00	1,800	100.0	1,470 2,499

Device	Routing	Invert	Outlet Devices
#1	Primary	54.70'	15.0" Round Culvert L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 54.70' / 54.50' S= 0.0133 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#2	Secondary	57.25'	5.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Device 1	54.70'	14.0" Vert. Orifice/Grate C= 0.600

Primary OutFlowMax=1.67 cfs @ 12.18 hrs HW=55.56' TW=55.37' (Dynamic Tailwater)

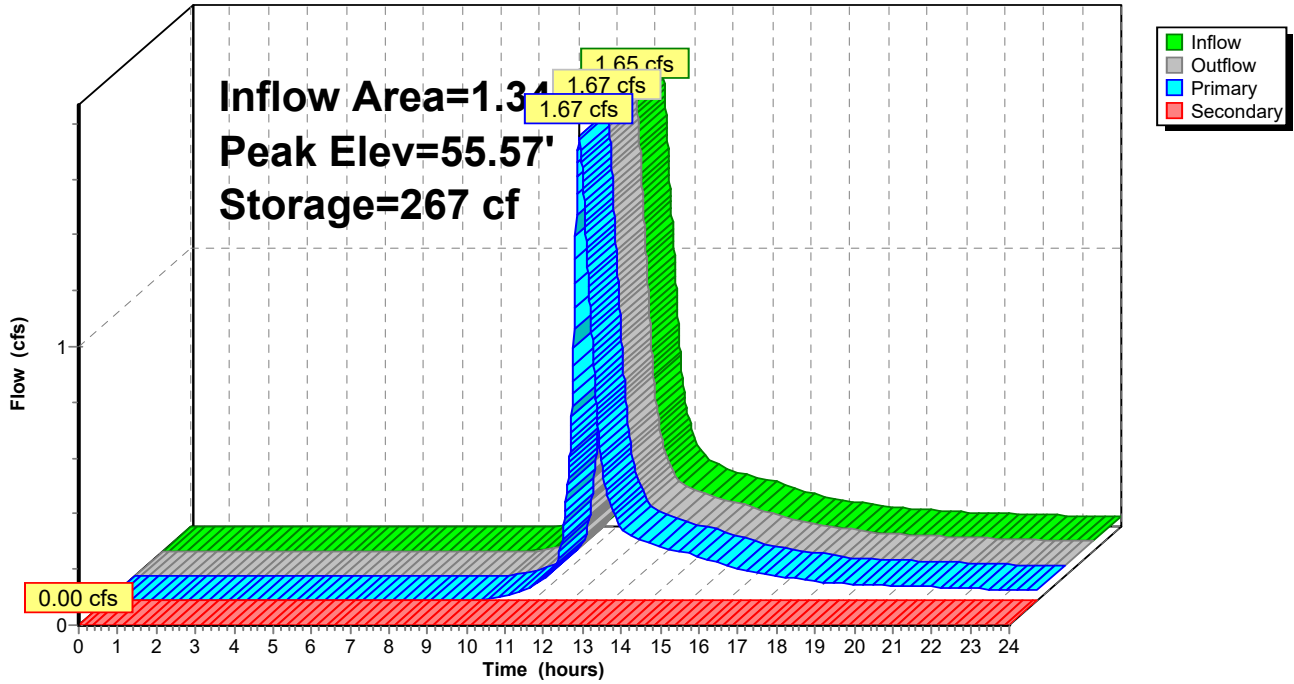
- ↑1=Culvert (Outlet Controls 1.67 cfs @ 2.61 fps)
- ↑3=Orifice/Grate (Passes 1.67 cfs of 1.77 cfs potential flow)

Secondary OutFlowMax=0.00 cfs @ 0.00 hrs HW=54.69' TW=54.25' (Dynamic Tailwater)

- ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond SDP: Stone Det. Pond

Hydrograph



Saratoga Way Post 1-7-2021

Prepared by Ross Engineering

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Type III 24-hr 10 yr Rainfall=5.57"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: SW	Runoff Area=20,610 sf 18.76% Impervious Runoff Depth>3.30" Tc=5.0 min CN=79 Runoff=1.90 cfs 0.130 af
Subcatchment2S: N	Runoff Area=20,291 sf 17.84% Impervious Runoff Depth>3.20" Flow Length=278' Tc=6.1 min CN=78 Runoff=1.74 cfs 0.124 af
Subcatchment3S: N	Runoff Area=32,810 sf 19.38% Impervious Runoff Depth>3.29" Flow Length=279' Tc=5.8 min CN=79 Runoff=2.93 cfs 0.207 af
Subcatchment4S: S HouseRoof	Runoff Area=2,140 sf 89.72% Impervious Runoff Depth>4.64" Tc=5.0 min CN=92 Runoff=0.26 cfs 0.019 af
Subcatchment5S: SE	Runoff Area=1,274 sf 11.30% Impervious Runoff Depth>3.01" Tc=5.0 min CN=76 Runoff=0.11 cfs 0.007 af
Subcatchment6S: N Roof	Runoff Area=1,920 sf 100.00% Impervious Runoff Depth>5.15" Tc=200.0 min CN=98 Runoff=0.04 cfs 0.019 af
Subcatchment7S: N	Runoff Area=3,567 sf 17.33% Impervious Runoff Depth>1.05" Tc=200.0 min CN=53 Runoff=0.02 cfs 0.007 af
ReachAP1: AP1	Inflow=4.61 cfs 0.510 af Outflow=4.61 cfs 0.510 af
Pond 1P: 18" Culvert	Peak Elev=55.81' Storage=328 cf Inflow=4.67 cfs 0.510 af 18.0" Round Culvert n=0.012 L=88.0' S=0.0017 '/' Outflow=4.61 cfs 0.510 af
Pond CB A: CB A	Peak Elev=57.38' Inflow=0.11 cfs 0.007 af 6.0" Round Culvert n=0.012 L=16.7' S=0.0102 '/' Outflow=0.11 cfs 0.007 af
Pond CB B: CB B	Peak Elev=57.05' Inflow=0.11 cfs 0.007 af 6.0" Round Culvert n=0.012 L=82.0' S=0.0101 '/' Outflow=0.11 cfs 0.007 af
Pond CB C: CB C	Peak Elev=56.30' Inflow=0.36 cfs 0.026 af 6.0" Round Culvert n=0.012 L=9.0' S=0.0222 '/' Outflow=0.36 cfs 0.026 af
Pond ITA: Inf. TrenchA	Peak Elev=57.50' Storage=0.000 af Inflow=0.11 cfs 0.007 af Primary=0.11 cfs 0.007 af Secondary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.007 af
Pond ITB: Inf. TrenchB	Peak Elev=56.50' Storage=0.001 af Inflow=0.37 cfs 0.026 af Primary=0.36 cfs 0.026 af Secondary=0.00 cfs 0.000 af Outflow=0.36 cfs 0.026 af
Pond PP: PerviousPavement	Peak Elev=56.26' Storage=1,365 cf Inflow=2.59 cfs 0.233 af Primary=1.99 cfs 0.231 af Secondary=0.00 cfs 0.000 af Outflow=1.99 cfs 0.231 af
Pond RG: Rain Garden	Peak Elev=56.31' Storage=270 cf Inflow=2.93 cfs 0.207 af Primary=2.58 cfs 0.206 af Secondary=0.00 cfs 0.000 af Outflow=2.58 cfs 0.206 af

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Type III 24-hr 10 yr Rainfall=5.57"

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Pond SDP: Stone Det. Pond

Peak Elev=56.14' Storage=443 cf Inflow=3.00 cfs 0.355 af
Primary=3.06 cfs 0.354 af Secondary=0.00 cfs 0.000 af Outflow=3.06 cfs 0.354 af

Total Runoff Area = 1.897 ac Runoff Volume = 0.513 af Average Runoff Depth = 3.25"
77.67% Pervious = 1.473 ac 22.33% Impervious = 0.423 ac

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Type III 24-hr 10 yr Rainfall=5.57"

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Summary for Subcatchment 1S: SW

Runoff = 1.90 cfs @ 12.07 hrs, Volume= 0.130 af, Depth> 3.30"

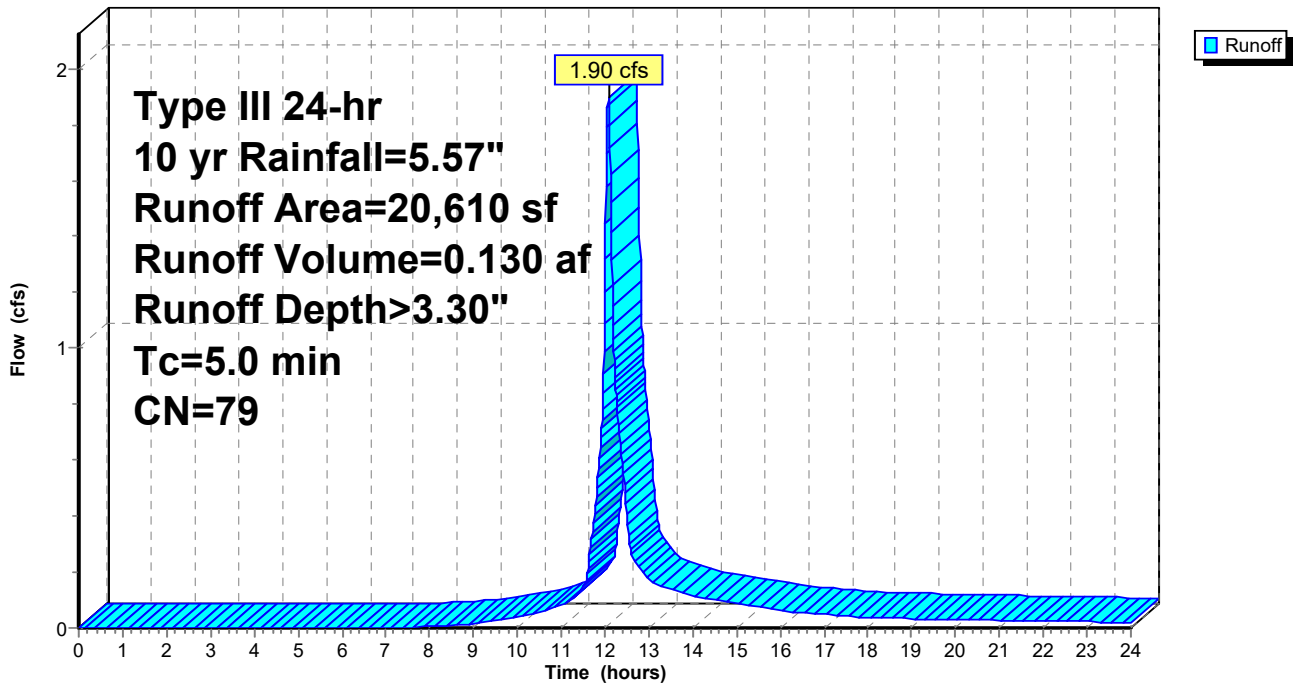
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.57"

Area (sf)	CN	Description
17,964	79	1 acre lots, 20% imp, HSG C
* 220	98	deck, HSG C
* 54	98	retaining wall, HSG C
2,372	74	>75% Grass cover, Good, HSG C
20,610	79	Weighted Average
16,743		81.24% Pervious Area
3,867		18.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 1S: SW

Hydrograph



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Type III 24-hr 10 yr Rainfall=5.57"

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Summary for Subcatchment 2S: N

Runoff = 1.74 cfs @ 12.09 hrs, Volume= 0.124 af, Depth> 3.20"

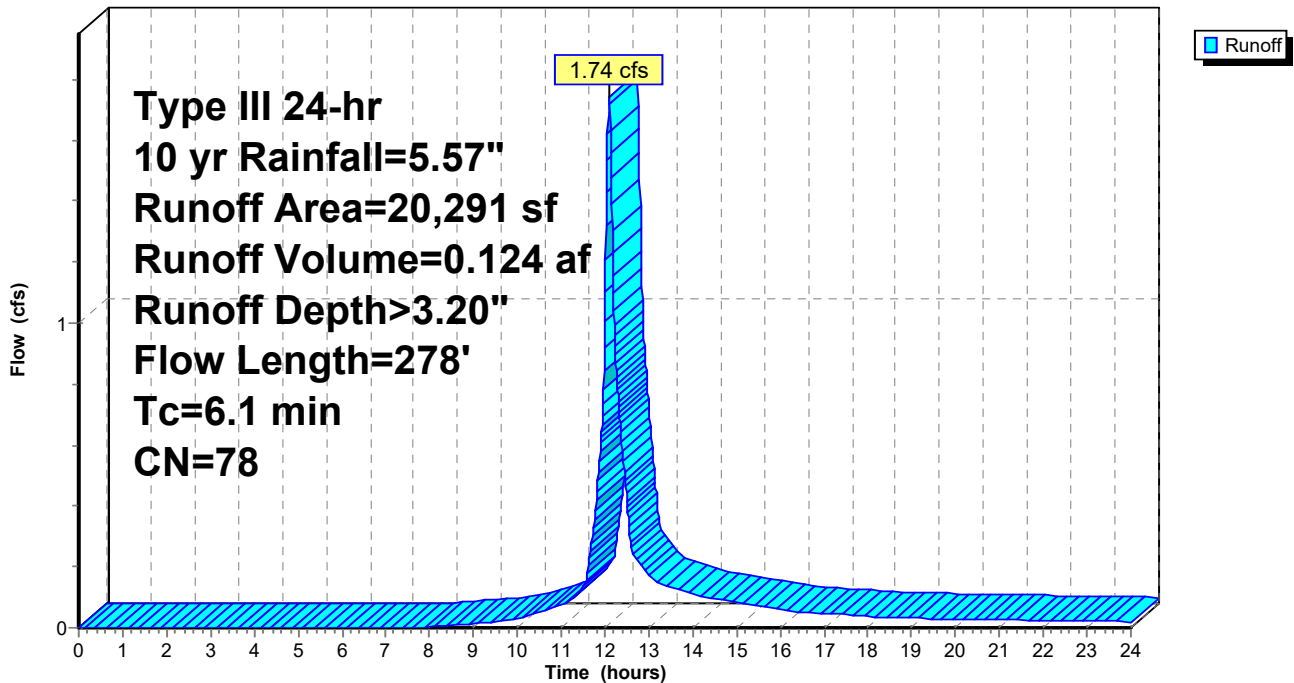
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.57"

Area (sf)	CN	Description
18,097	79	1 acre lots, 20% imp, HSG C
1,486	74	>75% Grass cover, Good, HSG C
* 708	55	Stone Detention Pond, HSG C
20,291	78	Weighted Average
16,672		82.16% Pervious Area
3,619		17.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	50	0.0200	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.68"
0.9	228	0.0750	4.11		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.1	278	Total			

Subcatchment 2S: N

Hydrograph



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Type III 24-hr 10 yr Rainfall=5.57"

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Summary for Subcatchment 3S: N

Runoff = 2.93 cfs @ 12.08 hrs, Volume= 0.207 af, Depth> 3.29"

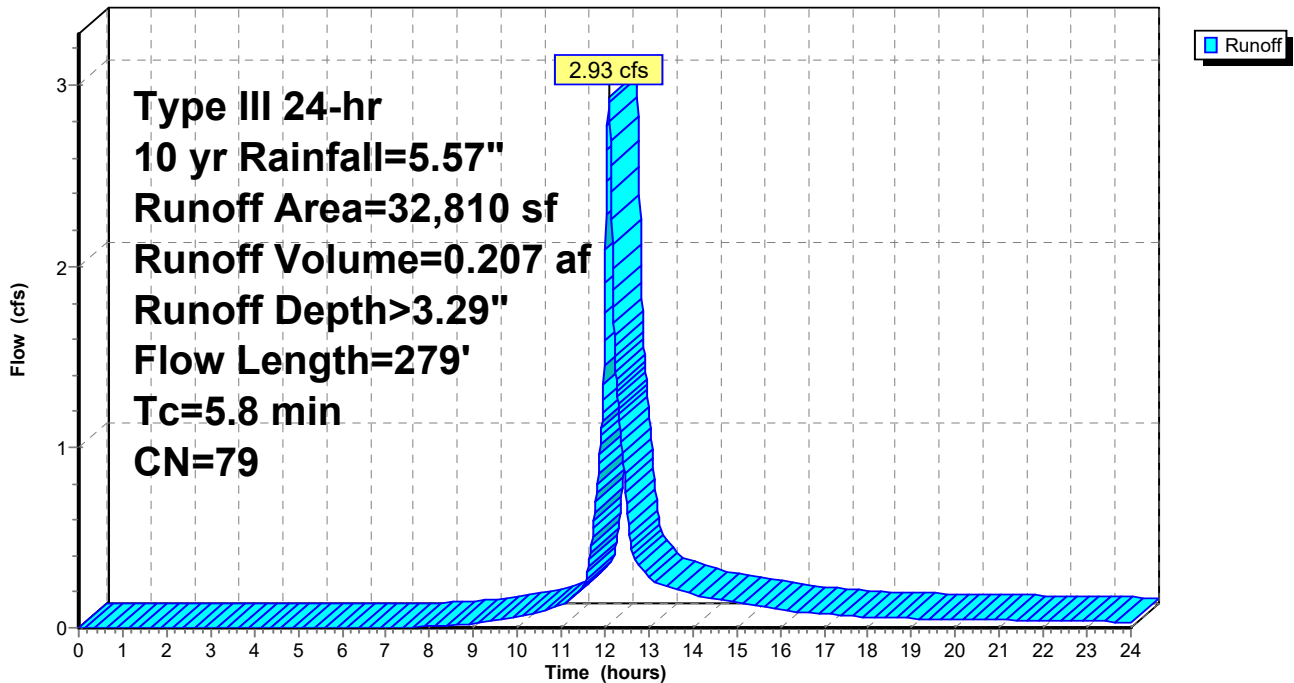
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.57"

Area (sf)	CN	Description
31,402	79	1 acre lots, 20% imp, HSG C
1,329	74	>75% Grass cover, Good, HSG C
* 79	98	Retaining Wall, HSG C
32,810	79	Weighted Average
26,451		80.62% Pervious Area
6,359		19.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0250	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.68"
1.0	229	0.0600	3.67		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
5.8	279	Total			

Subcatchment 3S: N

Hydrograph



Summary for Subcatchment 4S: S House Roof

Runoff = 0.26 cfs @ 12.07 hrs, Volume= 0.019 af, Depth> 4.64"

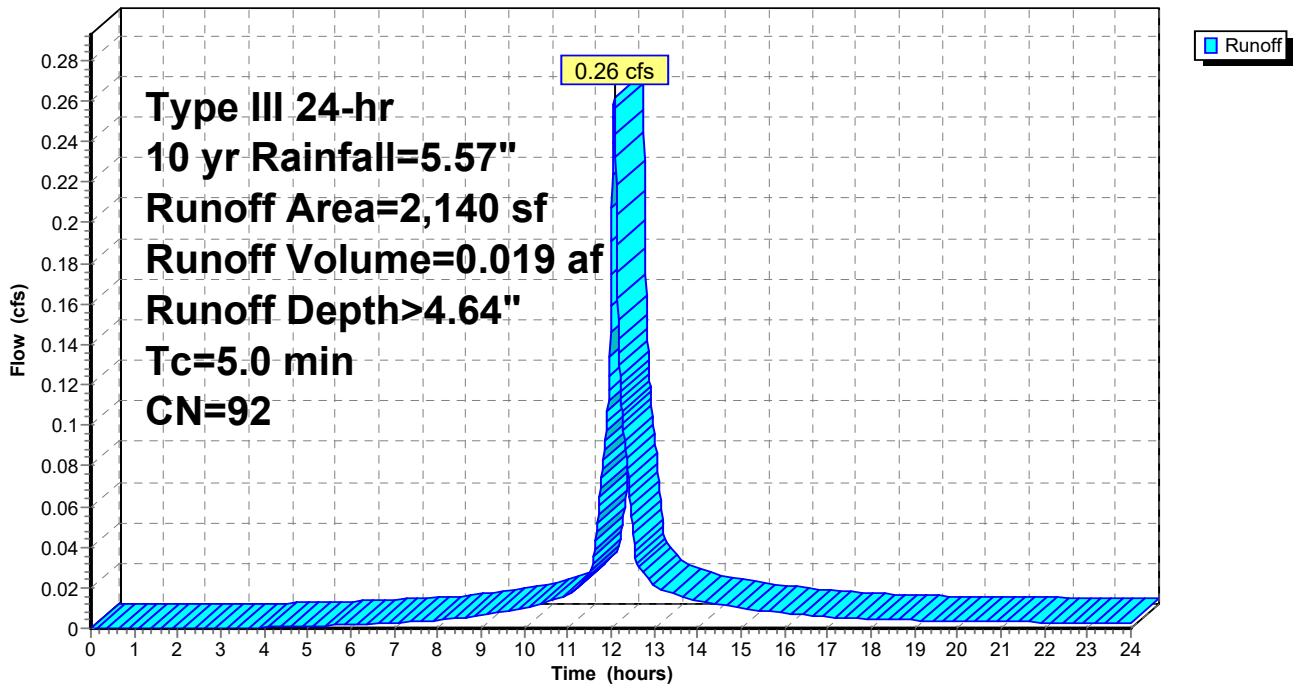
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.57"

Area (sf)	CN	Description
1,920	98	Roofs, HSG C
* 220	41	Infiltration Trench, HSG C
2,140	92	Weighted Average
220		10.28% Pervious Area
1,920		89.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 4S: S House Roof

Hydrograph



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Type III 24-hr 10 yr Rainfall=5.57"

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Summary for Subcatchment 5S: SE

Runoff = 0.11 cfs @ 12.08 hrs, Volume= 0.007 af, Depth> 3.01"

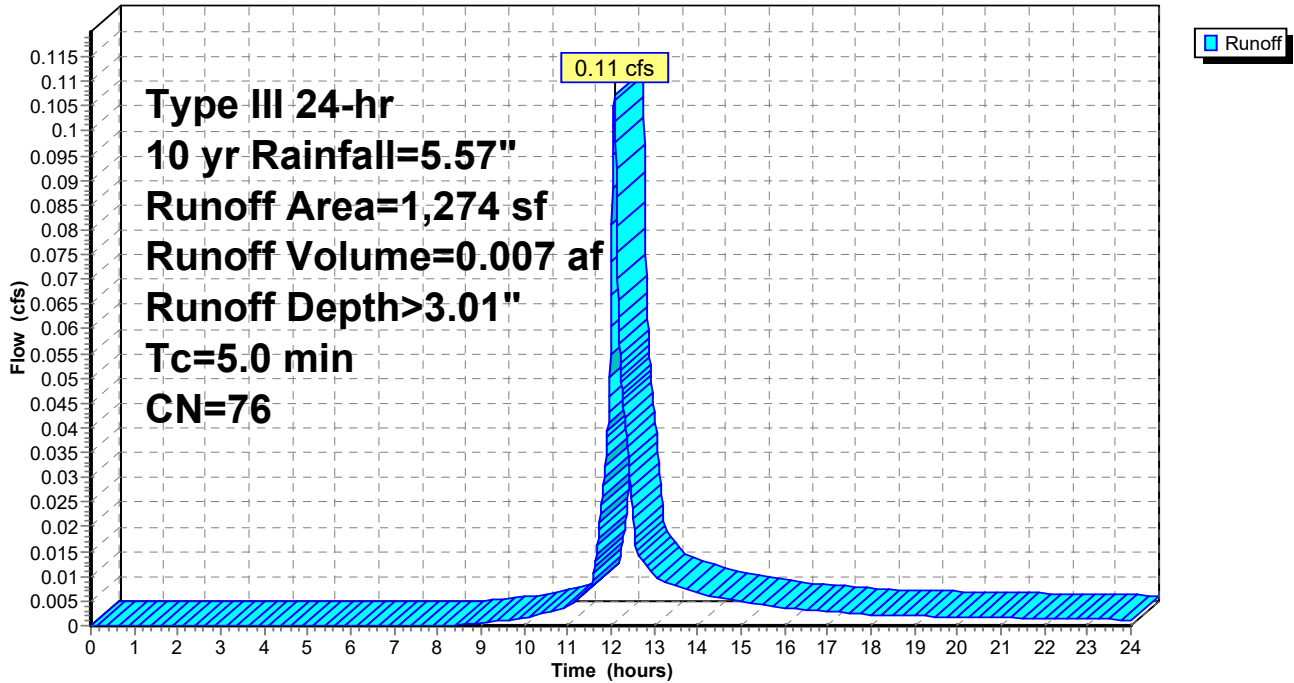
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.57"

	Area (sf)	CN	Description
	1,082	74	>75% Grass cover, Good, HSG C
*	144	98	Deck, HSG C
*	48	48	Infiltration Trench, HSG C
	1,274	76	Weighted Average
	1,130		88.70% Pervious Area
	144		11.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5S: SE

Hydrograph



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Type III 24-hr 10 yr Rainfall=5.57"

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Summary for Subcatchment 6S: N Roof

Runoff = 0.04 cfs @ 14.45 hrs, Volume= 0.019 af, Depth> 5.15"

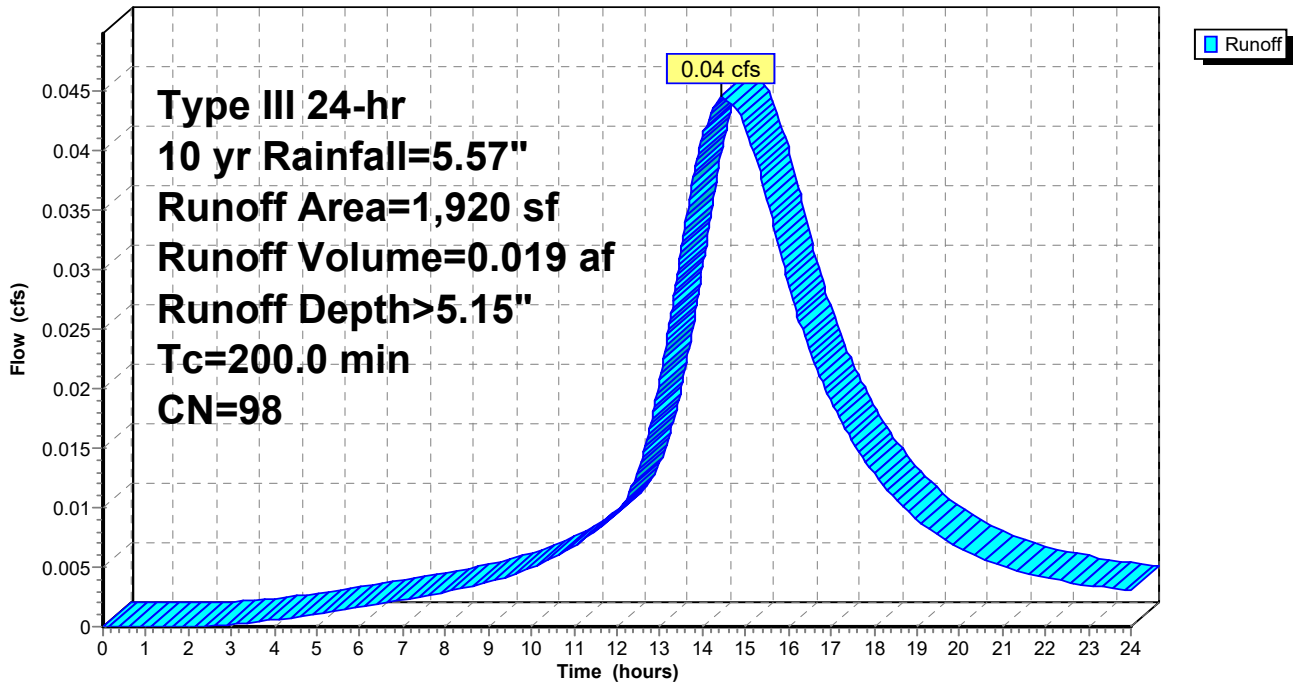
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.57"

Area (sf)	CN	Description
1,920	98	Roofs, HSG C
1,920		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
200.0					Direct Entry,

Subcatchment 6S: N Roof

Hydrograph



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Type III 24-hr 10 yr Rainfall=5.57"

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Summary for Subcatchment 7S: N

Runoff = 0.02 cfs @ 15.11 hrs, Volume= 0.007 af, Depth> 1.05"

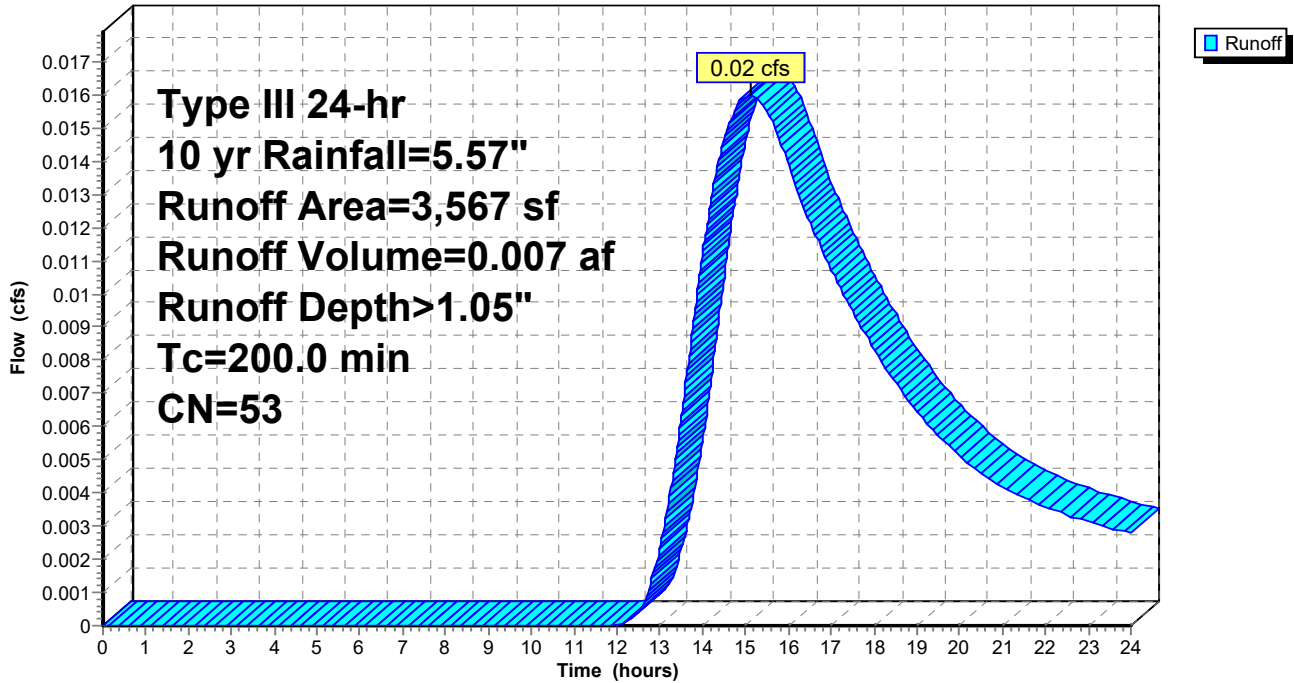
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 yr Rainfall=5.57"

Area (sf)	CN	Description
618	98	Paved parking, HSG C
231	74	>75% Grass cover, Good, HSG C
* 2,718	41	Pervious Pavement, HSG C
3,567	53	Weighted Average
2,949		82.67% Pervious Area
618		17.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
200.0					Direct Entry,

Subcatchment 7S: N

Hydrograph



Summary for Reach AP1: AP1

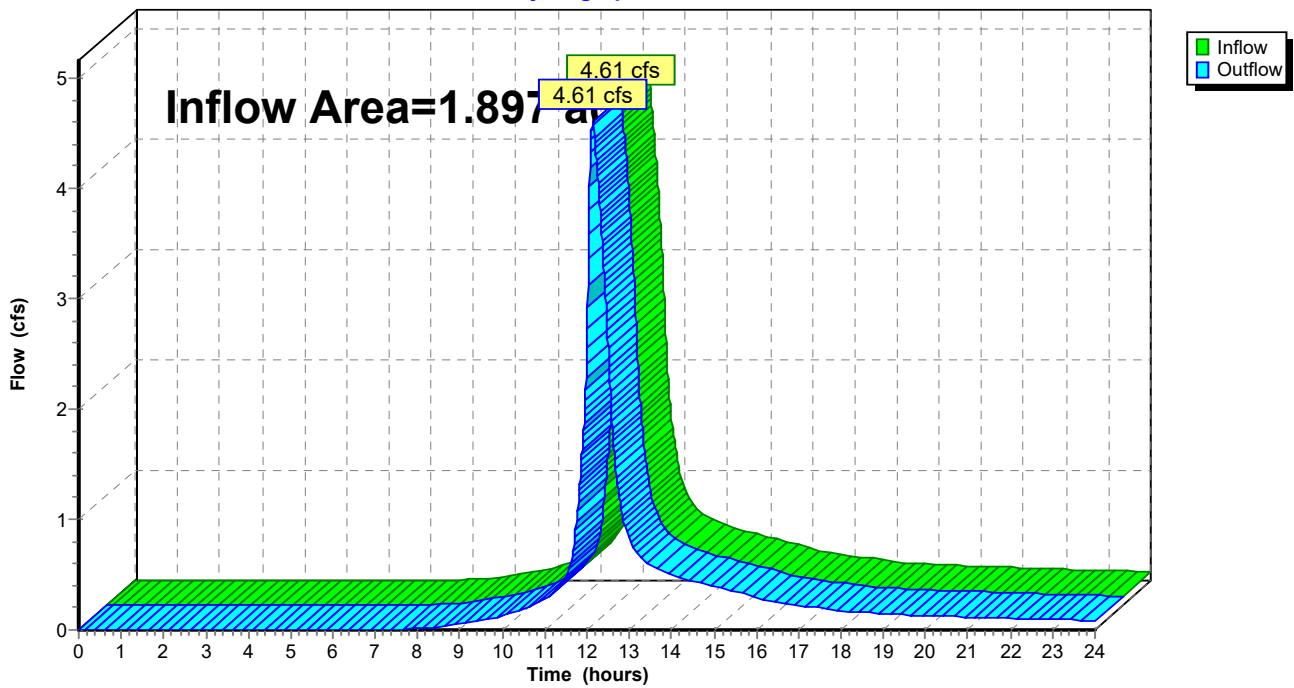
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.897 ac, 22.33% Impervious, Inflow Depth > 3.23" for 10 yr event
Inflow = 4.61 cfs @ 12.14 hrs, Volume= 0.510 af
Outflow = 4.61 cfs @ 12.14 hrs, Volume= 0.510 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Reach AP1: AP1

Hydrograph



Summary for Pond 1P: 18" Culvert

Inflow Area = 1.897 ac, 22.33% Impervious, Inflow Depth > 3.23" for 10 yr event
 Inflow = 4.67 cfs @ 12.11 hrs, Volume= 0.510 af
 Outflow = 4.61 cfs @ 12.14 hrs, Volume= 0.510 af, Atten= 1%, Lag= 1.3 min
 Primary = 4.61 cfs @ 12.14 hrs, Volume= 0.510 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 55.81'@ 12.14 hrs Surf.Area= 381 sf Storage= 328 cf

Plug-Flow detention time=1.8 min calculated for 0.510 af (100% of inflow)
 Center-of-Mass det. time=1.3 min (833.6 - 832.4)

Volume	Invert	Avail.Storage	Storage Description		
#1	54.25'	957 cf	Custom Stage Data (Irregular) listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.25	20	20.0	0	0	20
55.00	235	90.0	81	81	634
56.00	420	115.0	323	404	1,055
57.00	698	147.0	553	957	1,735

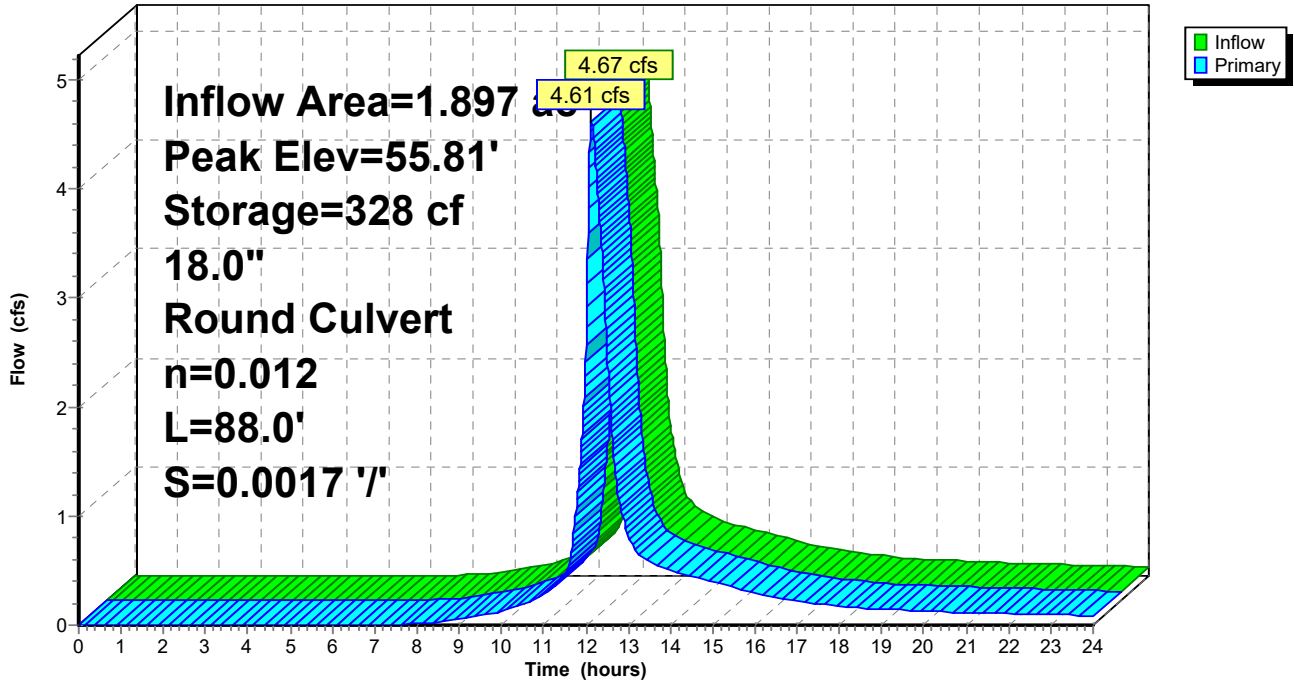
Device	Routing	Invert	Outlet Devices
#1	Primary	54.42'	18.0" Round Culvert L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 54.42' / 54.27' S= 0.0017'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.61 cfs @ 12.14 hrs HW=55.81' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Barrel Controls 4.61 cfs @ 3.51 fps)

Pond 1P: 18" Culvert

Hydrograph



Summary for Pond CB A: CB A

[57] Hint: Peaked at 57.38' (Flood elevation advised)

Inflow Area = 0.029 ac, 11.30% Impervious, Inflow Depth > 3.00" for 10 yr event
 Inflow = 0.11 cfs @ 12.08 hrs, Volume= 0.007 af
 Outflow = 0.11 cfs @ 12.08 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.11 cfs @ 12.08 hrs, Volume= 0.007 af

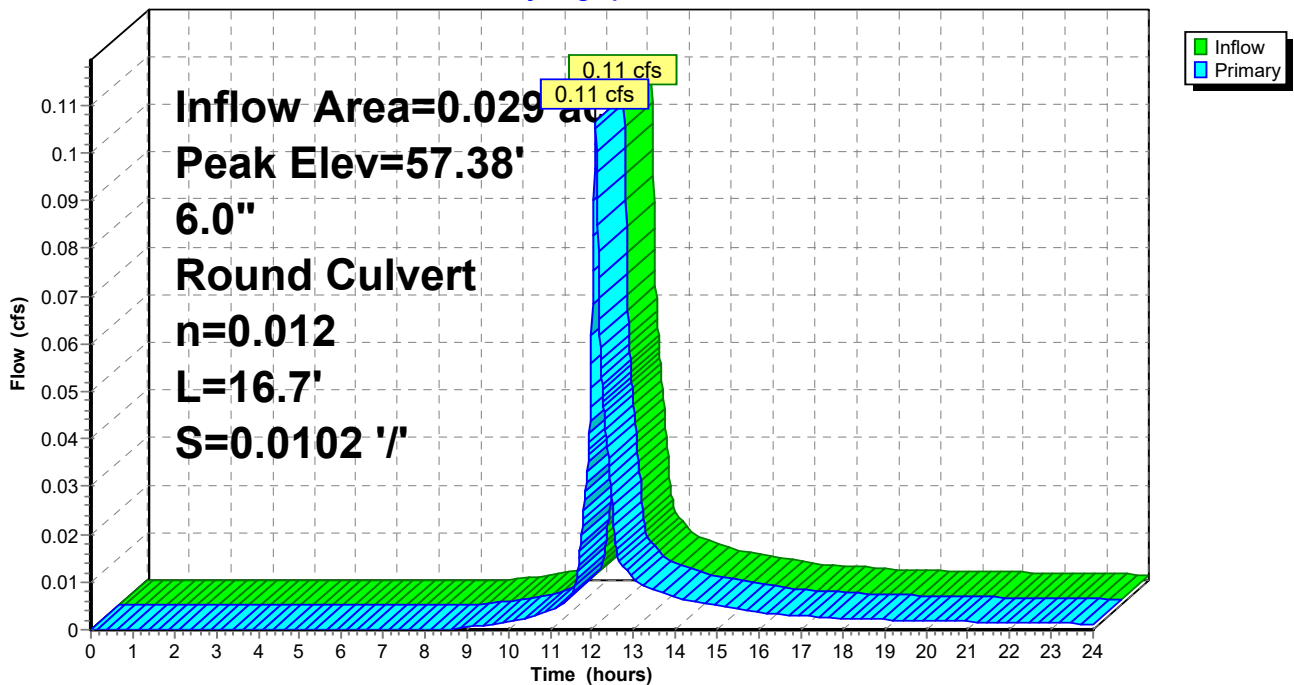
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 57.38' @ 12.08 hrs

Device #	Routing	Invert	Outlet Devices
1	Primary	57.17'	6.0" Round Culvert L= 16.7' Ke= 0.500 Inlet / Outlet Invert= 57.17' / 57.00' S= 0.0102'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.11 cfs @ 12.08 hrs HW=57.38' TW=57.05' (Dynamic Tailwater)
 ↑ 1=Culvert (Barrel Controls 0.11 cfs @ 2.07 fps)

Pond CB A: CB A

Hydrograph



Summary for Pond CB B: CB B

[57] Hint: Peaked at 57.05' (Flood elevation advised)

Inflow Area = 0.029 ac, 11.30% Impervious, Inflow Depth > 3.00" for 10 yr event
 Inflow = 0.11 cfs @ 12.08 hrs, Volume= 0.007 af
 Outflow = 0.11 cfs @ 12.08 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.11 cfs @ 12.08 hrs, Volume= 0.007 af

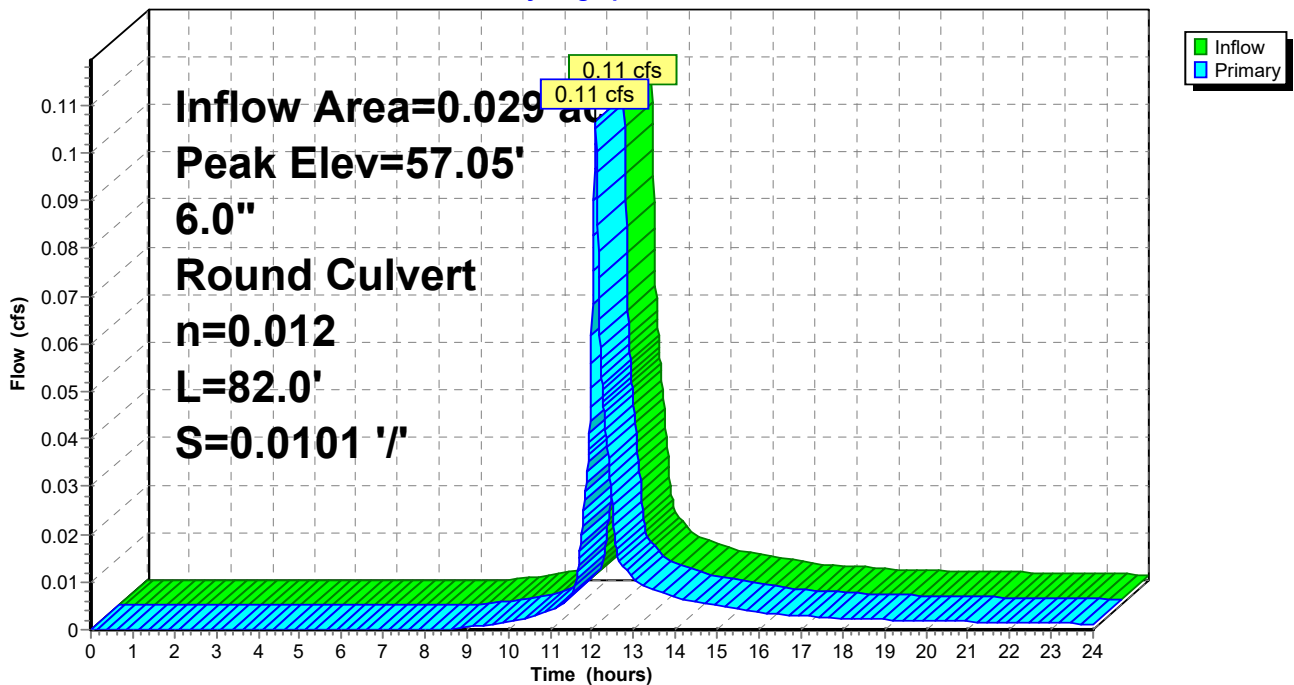
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 57.05' @ 12.08 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	56.83'	6.0" Round Culvert L= 82.0' Ke= 0.500 Inlet / Outlet Invert= 56.83' / 56.00' S= 0.0101 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.11 cfs @ 12.08 hrs HW=57.05' TW=56.50' (Dynamic Tailwater)
 ↑ **1=Culvert** (Outlet Controls 0.11 cfs @ 1.90 fps)

Pond CB B: CB B

Hydrograph



Summary for Pond CB C: CB C

[57] Hint: Peaked at 56.30' (Flood elevation advised)

Inflow Area = 0.078 ac, 60.46% Impervious, Inflow Depth > 4.02" for 10 yr event
 Inflow = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af
 Outflow = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af

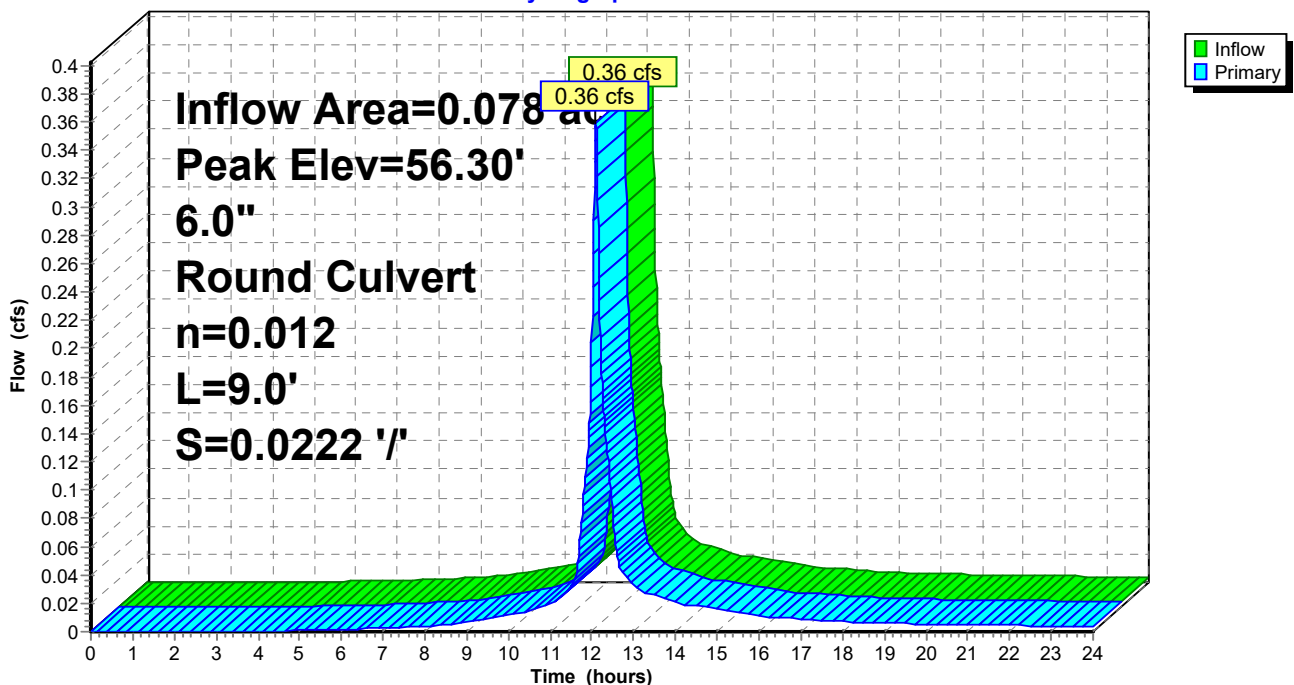
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.30'@ 12.09 hrs

Device #	Routing	Invert	Outlet Devices
1	Primary	55.90'	6.0" Round Culvert L= 9.0' Ke= 0.500 Inlet / Outlet Invert= 55.90' / 55.70' S= 0.0222 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.36 cfs @ 12.09 hrs HW=56.30' TW=55.76' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 0.36 cfs @ 2.15 fps)

Pond CB C: CB C

Hydrograph



Summary for Pond ITA: Inf. Trench A

Inflow Area = 0.029 ac, 11.30% Impervious, Inflow Depth > 3.01" for 10 yr event
 Inflow = 0.11 cfs @ 12.08 hrs, Volume= 0.007 af
 Outflow = 0.11 cfs @ 12.08 hrs, Volume= 0.007 af, Atten= 0%, Lag= 0.4 min
 Primary = 0.11 cfs @ 12.08 hrs, Volume= 0.007 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 57.50' @ 12.08 hrs Surf.Area= 0.001 ac Storage= 0.000 af

Plug-Flow detention time=2.7 min calculated for 0.007 af (100% of inflow)
 Center-of-Mass det. time=1.7 min (827.5 - 825.8)

Volume	Invert	Avail.Storage	Storage Description
#1	57.25'	0.001 af	2.00'W x 24.00'L x 3.25'H Prismatic 0.004 af Overall x 40.0% Voids

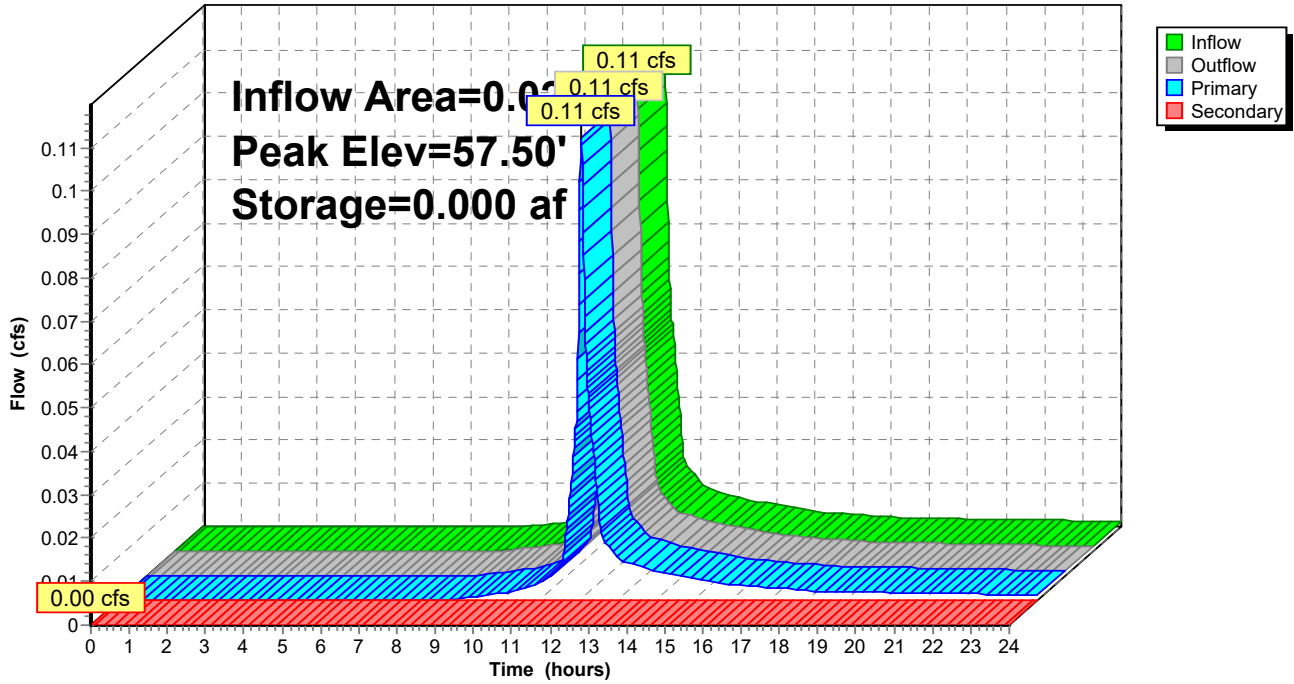
Device	Routing	Invert	Outlet Devices
#1	Primary	57.25'	6.0" Round Culvert L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 57.25' / 57.25' S= 0.0000' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	59.40'	24.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.11 cfs @ 12.08 hrs HW=57.50' TW=57.38' (Dynamic Tailwater)
 ↑1=Culvert (Barrel Controls 0.11 cfs @ 1.59 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.25' TW=57.17' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond ITA: Inf. Trench A

Hydrograph



Summary for Pond ITB: Inf. Trench B

Inflow Area = 0.078 ac, 60.46% Impervious, Inflow Depth > 4.03" for 10 yr event
 Inflow = 0.37 cfs @ 12.07 hrs, Volume= 0.026 af
 Outflow = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af, Atten= 2%, Lag= 1.0 min
 Primary = 0.36 cfs @ 12.09 hrs, Volume= 0.026 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.50' @ 12.09 hrs Surf.Area= 0.004 ac Storage= 0.001 af

Plug-Flow detention time=5.3 min calculated for 0.026 af (100% of inflow)
 Center-of-Mass det. time=3.6 min (795.3 - 791.7)

Volume	Invert	Avail.Storage	Storage Description
#1	56.00'	0.005 af	2.00'W x 82.00'L x 3.00'H Prismatic 0.011 af Overall x 40.0% Voids

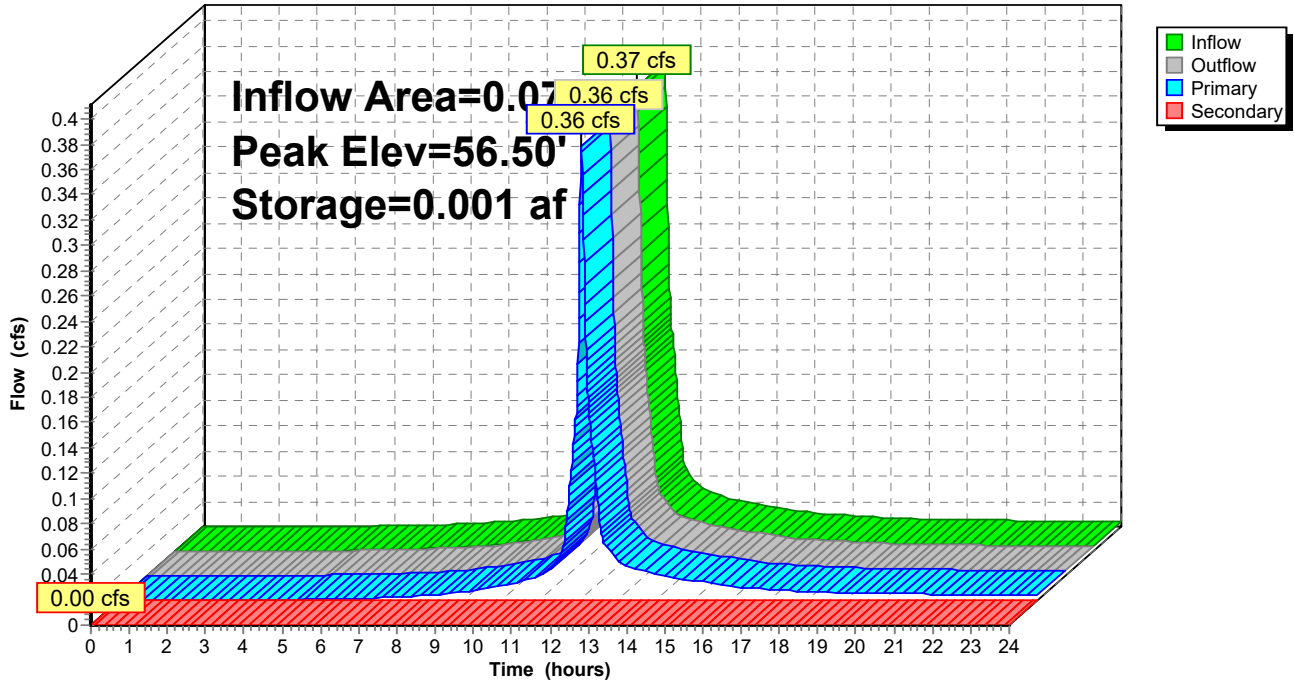
Device	Routing	Invert	Outlet Devices
#1	Primary	56.00'	6.0" Round Culvert L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 56.00' / 56.00' S= 0.0000' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	58.90'	96.5' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.36 cfs @ 12.09 hrs HW=56.50' TW=56.30' (Dynamic Tailwater)
 ↑1=Culvert (Barrel Controls 0.36 cfs @ 2.28 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=56.00' TW=55.90' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond ITB: Inf. Trench B

Hydrograph



Summary for Pond PP: Pervious Pavement

Inflow Area = 0.879 ac, 23.23% Impervious, Inflow Depth > 3.17" for 10 yr event
 Inflow = 2.59 cfs @ 12.09 hrs, Volume= 0.233 af
 Outflow = 1.99 cfs @ 12.25 hrs, Volume= 0.231 af, Atten= 23%, Lag= 9.2 min
 Primary = 1.99 cfs @ 12.25 hrs, Volume= 0.231 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.26'@ 12.19 hrs Surf.Area= 2,718 sf Storage= 1,365 cf

Plug-Flow detention time=15.6 min calculated for 0.231 af (99% of inflow)
 Center-of-Mass det. time=11.2 min (845.4 - 834.2)

Volume	Invert	Avail.Storage	Storage Description
#1	55.00'	2,147 cf	Custom Stage Data (Prismatic) listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.00	2,718	0.0	0	0
55.01	2,718	40.0	11	11
56.42	2,718	40.0	1,533	1,544
56.43	2,718	15.0	4	1,548
56.67	2,718	15.0	98	1,646
56.68	2,718	5.0	1	1,647
57.33	2,718	5.0	88	1,735
57.34	2,718	30.0	8	1,744
57.67	2,718	30.0	269	2,013
57.68	2,718	15.0	4	2,017
58.00	2,718	15.0	130	2,147

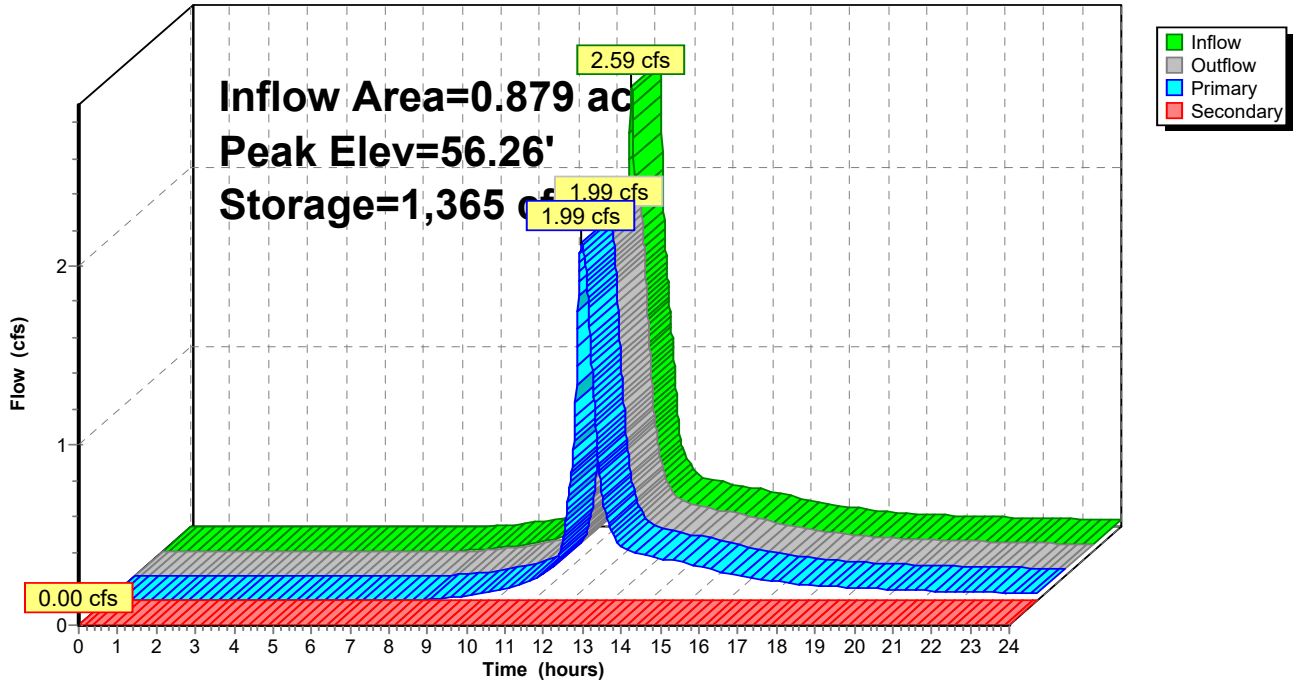
Device	Routing	Invert	Outlet Devices
#1	Primary	55.00'	10.0" Round Culvert X 2.00L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 55.00' / 54.85' S= 0.0150'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.55 sf
#2	Secondary	57.90'	20.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=1.99 cfs @ 12.25 hrs HW=56.20' TW=56.06' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 1.99 cfs @ 1.83 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=55.00' TW=54.69' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PP: Pervious Pavement

Hydrograph



Summary for Pond RG: Rain Garden

Inflow Area = 0.753 ac, 19.38% Impervious, Inflow Depth > 3.29" for 10 yr event
 Inflow = 2.93 cfs @ 12.08 hrs, Volume= 0.207 af
 Outflow = 2.58 cfs @ 12.09 hrs, Volume= 0.206 af, Atten= 12%, Lag= 0.5 min
 Primary = 2.58 cfs @ 12.09 hrs, Volume= 0.206 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.31'@ 12.17 hrs Surf.Area= 607 sf Storage= 270 cf

Plug-Flow detention time=3.1 min calculated for 0.206 af (100% of inflow)
 Center-of-Mass det. time=2.2 min (821.1 - 818.9)

Volume	Invert	Avail.Storage	Storage Description			
#1	55.20'	811 cf	Custom Stage Data (Conid) listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
55.20	607	0.0	0	0	607	
55.21	607	40.0	2	2	608	
56.50	607	40.0	313	316	721	
56.51	400	100.0	5	321	928	
57.00	607	100.0	245	566	1,138	
57.35	800	100.0	245	811	1,334	

Device	Routing	Invert	Outlet Devices											
#1	Secondary	56.90'	8.0' long x 2.0' breadth Broad-Crested Rectangular Weir											
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00											
			2.50 3.00 3.50											
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85											
			3.07 3.20 3.32											
#2	Primary	55.20'	10.0" Round Culvert X 3.00L= 5.0' Ke= 0.500											
			Inlet / Outlet Invert= 55.20' / 55.15' S= 0.0100'/' Cc= 0.900											
			n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.55 sf											

Primary OutFlowMax=2.63 cfs @ 12.09 hrs HW=56.13' TW=56.01' (Dynamic Tailwater)

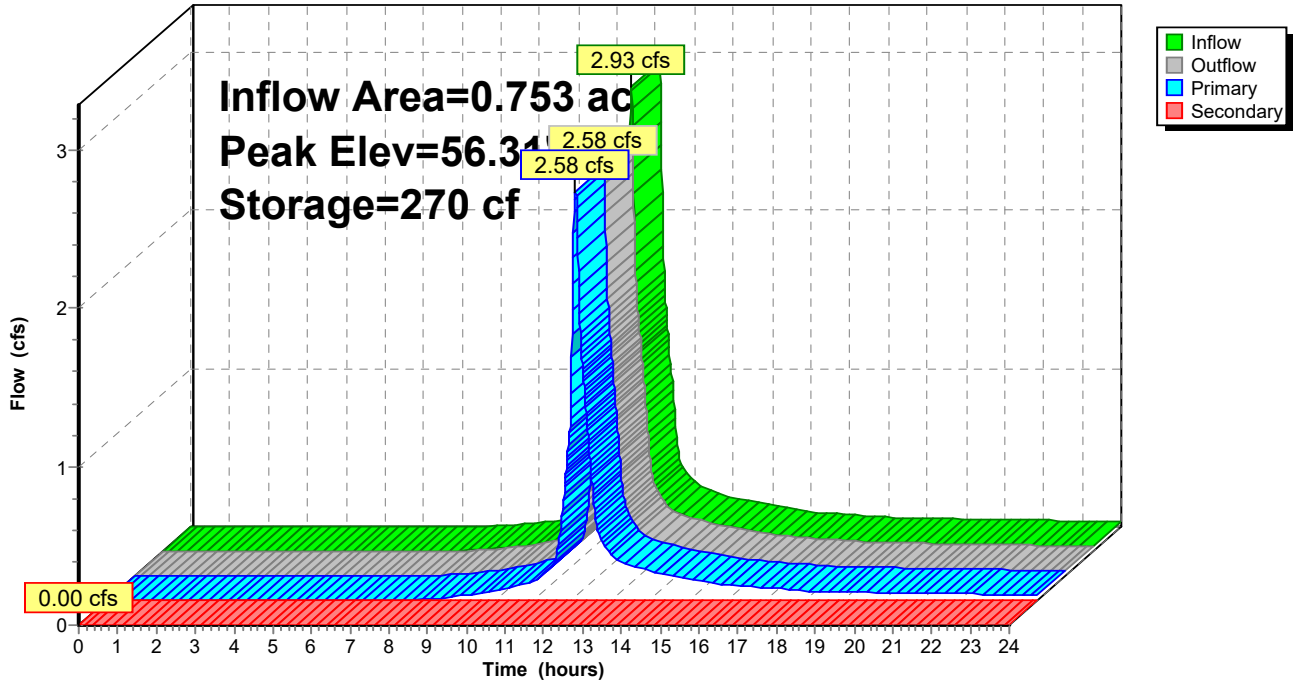
↑**2=Culvert** (Inlet Controls 2.63 cfs @ 1.61 fps)

Secondary OutFlowMax=0.00 cfs @ 0.00 hrs HW=55.20' TW=54.69' (Dynamic Tailwater)

↑**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond RG: Rain Garden

Hydrograph



Summary for Pond SDP: Stone Det. Pond

[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 1.345 ac, 21.36% Impervious, Inflow Depth > 3.17" for 10 yr event
 Inflow = 3.00 cfs @ 12.16 hrs, Volume= 0.355 af
 Outflow = 3.06 cfs @ 12.20 hrs, Volume= 0.354 af, Atten= 0%, Lag= 2.3 min
 Primary = 3.06 cfs @ 12.20 hrs, Volume= 0.354 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.14'@ 12.17 hrs Surf.Area= 767 sf Storage= 443 cf

Plug-Flow detention time=4.5 min calculated for 0.354 af (100% of inflow)
 Center-of-Mass det. time=3.1 min (840.3 - 837.1)

Volume	Invert	Avail.Storage	Storage Description
#1	54.69'	2,499 cf	Custom Stage Data (Prismatic) listed below
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)
54.69	1	0.0	0
54.70	767	40.0	2
56.50	767	40.0	552
56.51	767	100.0	8
57.00	1,140	100.0	467
58.00	1,800	100.0	1,470

Device	Routing	Invert	Outlet Devices
#1	Primary	54.70'	15.0" Round Culvert L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 54.70' / 54.50' S= 0.0133 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#2	Secondary	57.25'	5.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Device 1	54.70'	14.0" Vert. Orifice/Grate C= 0.600

Primary OutFlowMax=3.06 cfs @ 12.20 hrs HW=56.12' TW=55.76' (Dynamic Tailwater)

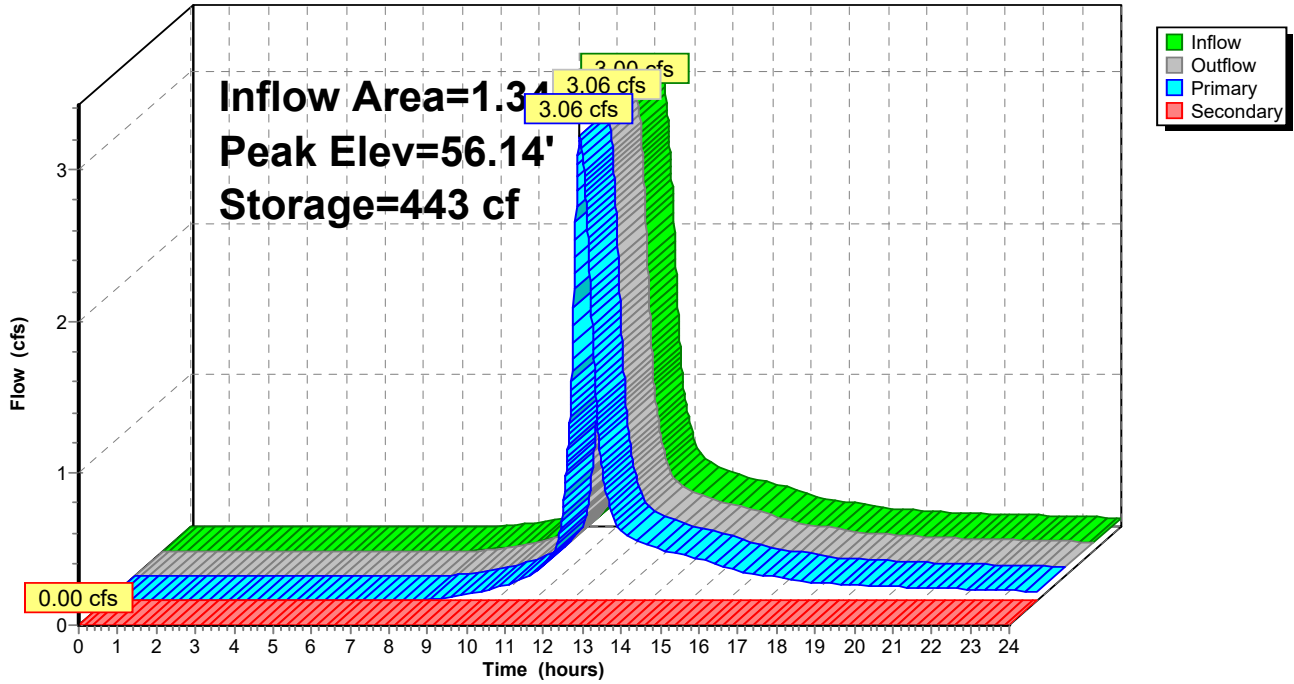
↑1=Culvert (Passes 3.06 cfs of 3.51 cfs potential flow)
 ↑3=Orifice/Grate (Orifice Controls 3.06 cfs @ 2.86 fps)

Secondary OutFlowMax=0.00 cfs @ 0.00 hrs HW=54.69' TW=54.25' (Dynamic Tailwater)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond SDP: Stone Det. Pond

Hydrograph



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Type III 24-hr 25 yr Rainfall=7.06"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: SW	Runoff Area=20,610 sf 18.76% Impervious Runoff Depth>4.64" Tc=5.0 min CN=79 Runoff=2.65 cfs 0.183 af
Subcatchment2S: N	Runoff Area=20,291 sf 17.84% Impervious Runoff Depth>4.52" Flow Length=278' Tc=6.1 min CN=78 Runoff=2.45 cfs 0.176 af
Subcatchment3S: N	Runoff Area=32,810 sf 19.38% Impervious Runoff Depth>4.63" Flow Length=279' Tc=5.8 min CN=79 Runoff=4.10 cfs 0.291 af
Subcatchment4S: S HouseRoof	Runoff Area=2,140 sf 89.72% Impervious Runoff Depth>6.11" Tc=5.0 min CN=92 Runoff=0.34 cfs 0.025 af
Subcatchment5S: SE	Runoff Area=1,274 sf 11.30% Impervious Runoff Depth>4.31" Tc=5.0 min CN=76 Runoff=0.15 cfs 0.010 af
Subcatchment6S: N Roof	Runoff Area=1,920 sf 100.00% Impervious Runoff Depth>6.59" Tc=200.0 min CN=98 Runoff=0.06 cfs 0.024 af
Subcatchment7S: N	Runoff Area=3,567 sf 17.33% Impervious Runoff Depth>1.83" Tc=200.0 min CN=53 Runoff=0.03 cfs 0.013 af
ReachAP1: AP1	Inflow=6.09 cfs 0.718 af Outflow=6.09 cfs 0.718 af
Pond 1P: 18" Culvert	Peak Elev=56.12' Storage=456 cf Inflow=6.23 cfs 0.718 af 18.0" Round Culvert n=0.012 L=88.0' S=0.0017 '/' Outflow=6.09 cfs 0.718 af
Pond CB A: CB A	Peak Elev=57.42' Inflow=0.15 cfs 0.010 af 6.0" Round Culvert n=0.012 L=16.7' S=0.0102 '/' Outflow=0.15 cfs 0.010 af
Pond CB B: CB B	Peak Elev=57.11' Inflow=0.15 cfs 0.010 af 6.0" Round Culvert n=0.012 L=82.0' S=0.0101 '/' Outflow=0.15 cfs 0.010 af
Pond CB C: CB C	Peak Elev=56.39' Inflow=0.47 cfs 0.035 af 6.0" Round Culvert n=0.012 L=9.0' S=0.0222 '/' Outflow=0.47 cfs 0.035 af
Pond ITA: Inf. TrenchA	Peak Elev=57.55' Storage=0.000 af Inflow=0.15 cfs 0.010 af Primary=0.15 cfs 0.010 af Secondary=0.00 cfs 0.000 af Outflow=0.15 cfs 0.010 af
Pond ITB: Inf. TrenchB	Peak Elev=56.63' Storage=0.001 af Inflow=0.49 cfs 0.035 af Primary=0.47 cfs 0.035 af Secondary=0.00 cfs 0.000 af Outflow=0.47 cfs 0.035 af
Pond PP: PerviousPavement	Peak Elev=56.91' Storage=1,679 cf Inflow=3.43 cfs 0.324 af Primary=2.45 cfs 0.322 af Secondary=0.00 cfs 0.000 af Outflow=2.45 cfs 0.322 af
Pond RG: Rain Garden	Peak Elev=56.99' Storage=560 cf Inflow=4.10 cfs 0.291 af Primary=3.42 cfs 0.287 af Secondary=0.56 cfs 0.003 af Outflow=3.42 cfs 0.291 af

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Type III 24-hr 25 yr Rainfall=7.06"

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Pond SDP: Stone Det. Pond

Peak Elev=56.75' Storage=786 cf Inflow=4.79 cfs 0.501 af
Primary=4.17 cfs 0.500 af Secondary=0.00 cfs 0.000 af Outflow=4.17 cfs 0.500 af

Total Runoff Area = 1.897 ac Runoff Volume = 0.722 af Average Runoff Depth = 4.57"
77.67% Pervious = 1.473 ac 22.33% Impervious = 0.423 ac

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Type III 24-hr 25 yr Rainfall=7.06"

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Summary for Subcatchment 1S: SW

Runoff = 2.65 cfs @ 12.07 hrs, Volume= 0.183 af, Depth> 4.64"

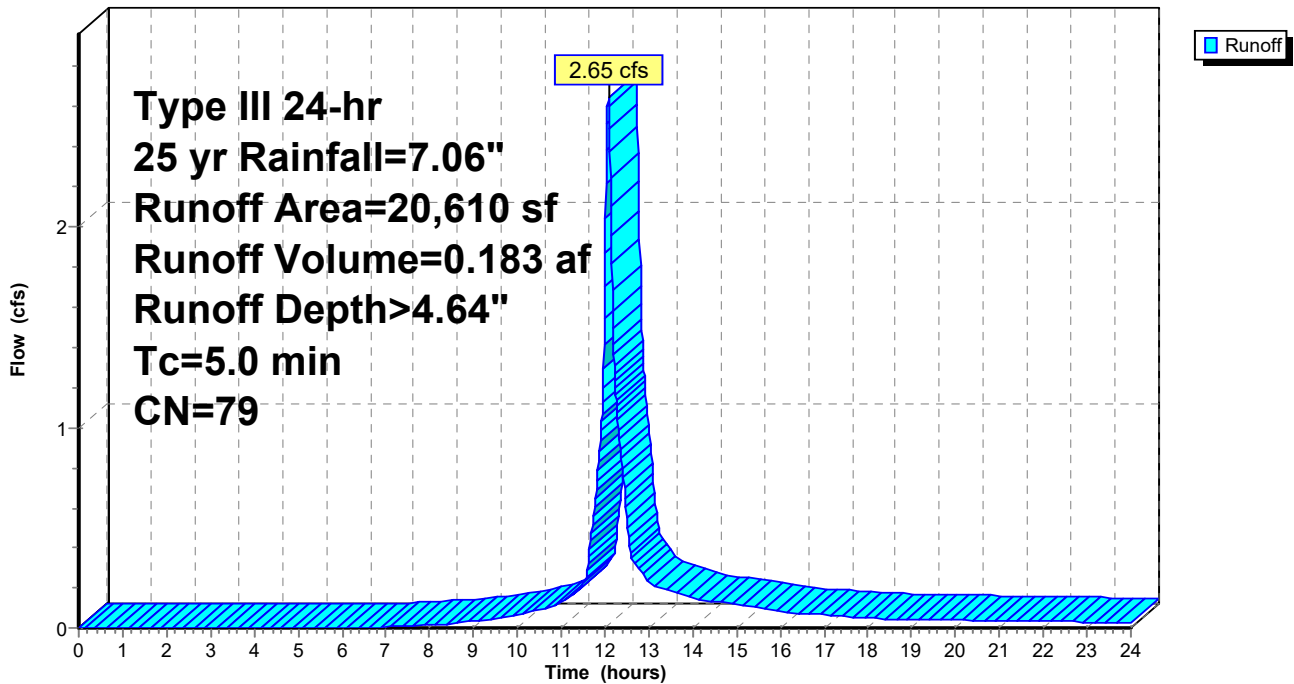
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=7.06"

Area (sf)	CN	Description
17,964	79	1 acre lots, 20% imp, HSG C
* 220	98	deck, HSG C
* 54	98	retaining wall, HSG C
2,372	74	>75% Grass cover, Good, HSG C
20,610	79	Weighted Average
16,743		81.24% Pervious Area
3,867		18.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 1S: SW

Hydrograph



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Type III 24-hr 25 yr Rainfall=7.06"

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Summary for Subcatchment 2S: N

Runoff = 2.45 cfs @ 12.09 hrs, Volume= 0.176 af, Depth> 4.52"

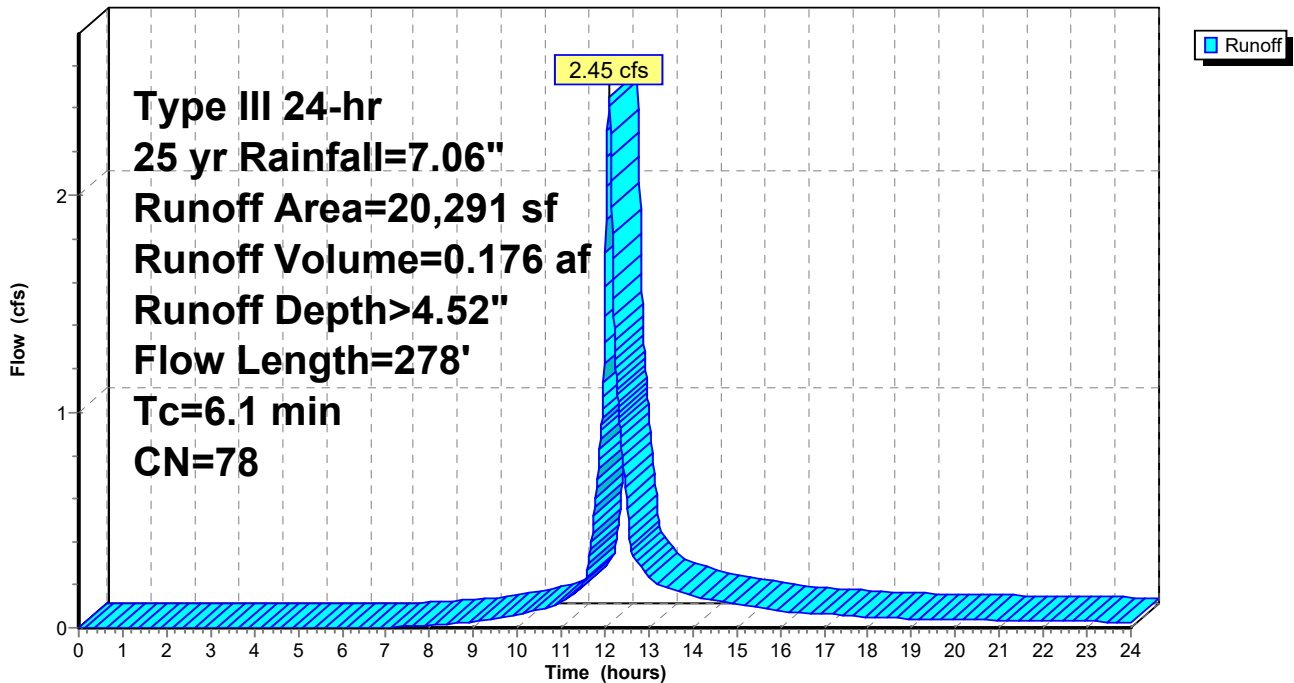
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=7.06"

Area (sf)	CN	Description
18,097	79	1 acre lots, 20% imp, HSG C
1,486	74	>75% Grass cover, Good, HSG C
* 708	55	Stone Detention Pond, HSG C
20,291	78	Weighted Average
16,672		82.16% Pervious Area
3,619		17.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	50	0.0200	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.68"
0.9	228	0.0750	4.11		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.1	278	Total			

Subcatchment 2S: N

Hydrograph



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Type III 24-hr 25 yr Rainfall=7.06"

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Summary for Subcatchment 3S: N

Runoff = 4.10 cfs @ 12.08 hrs, Volume= 0.291 af, Depth> 4.63"

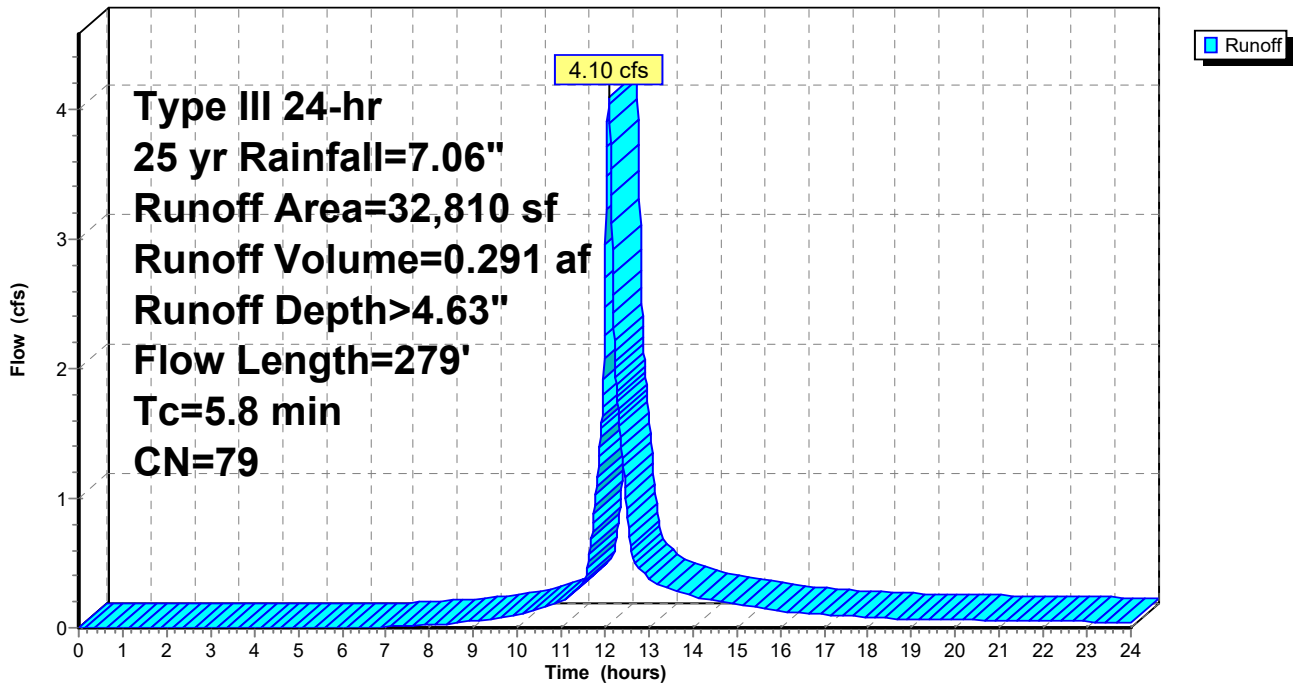
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=7.06"

Area (sf)	CN	Description
31,402	79	1 acre lots, 20% imp, HSG C
1,329	74	>75% Grass cover, Good, HSG C
*	79	98 Retaining Wall, HSG C
32,810	79	Weighted Average
26,451		80.62% Pervious Area
6,359		19.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0250	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.68"
1.0	229	0.0600	3.67		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
5.8	279	Total			

Subcatchment 3S: N

Hydrograph



Summary for Subcatchment 4S: S House Roof

Runoff = 0.34 cfs @ 12.07 hrs, Volume= 0.025 af, Depth> 6.11"

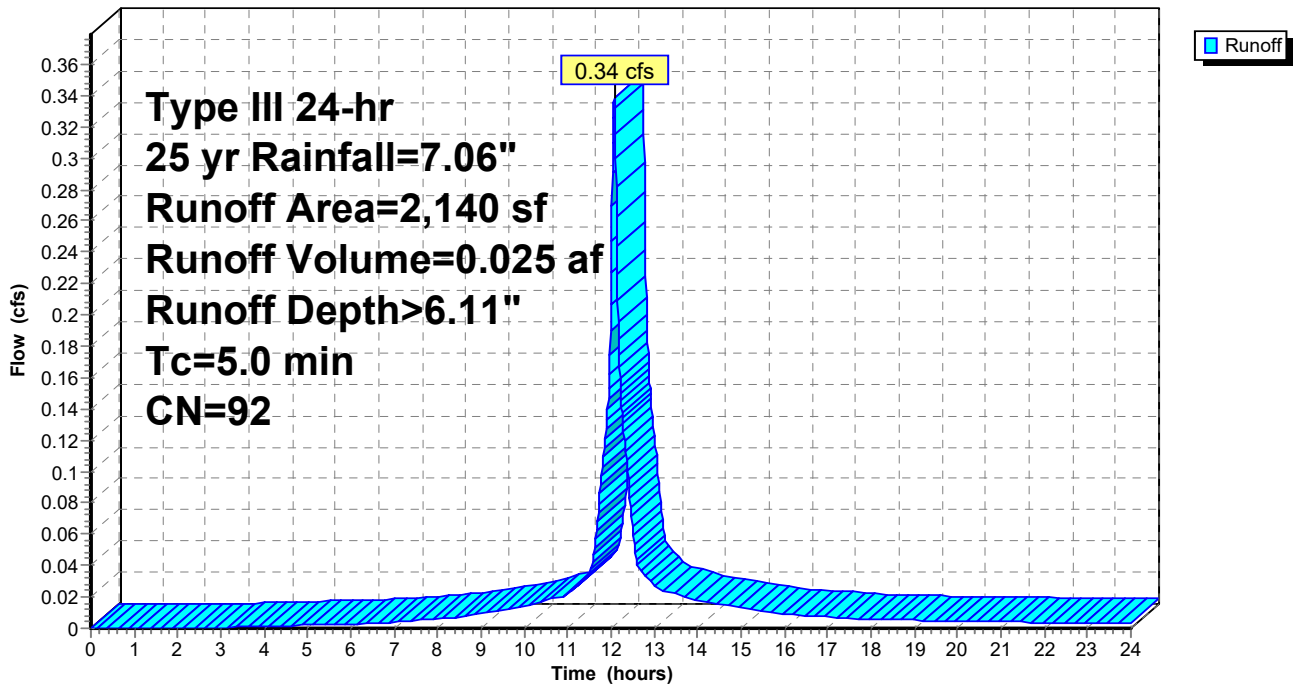
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25 yr Rainfall=7.06"

Area (sf)	CN	Description
1,920	98	Roofs, HSG C
* 220	41	Infiltration Trench, HSG C
2,140	92	Weighted Average
220		10.28% Pervious Area
1,920		89.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 4S: S House Roof

Hydrograph



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Type III 24-hr 25 yr Rainfall=7.06"

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Summary for Subcatchment 5S: SE

Runoff = 0.15 cfs @ 12.07 hrs, Volume= 0.010 af, Depth> 4.31"

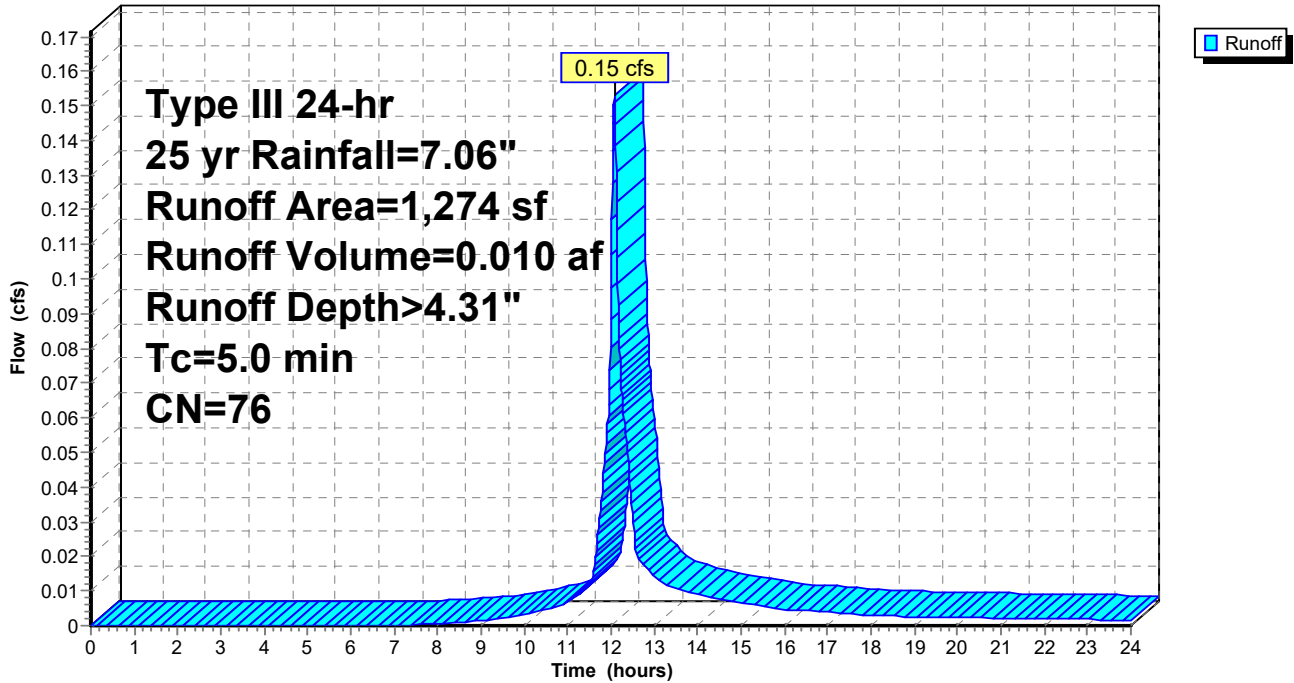
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=7.06"

Area (sf)	CN	Description
1,082	74	>75% Grass cover, Good, HSG C
* 144	98	Deck, HSG C
* 48	48	Infiltration Trench, HSG C
1,274	76	Weighted Average
1,130		88.70% Pervious Area
144		11.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5S: SE

Hydrograph



Summary for Subcatchment 6S: N Roof

Runoff = 0.06 cfs @ 14.45 hrs, Volume= 0.024 af, Depth> 6.59"

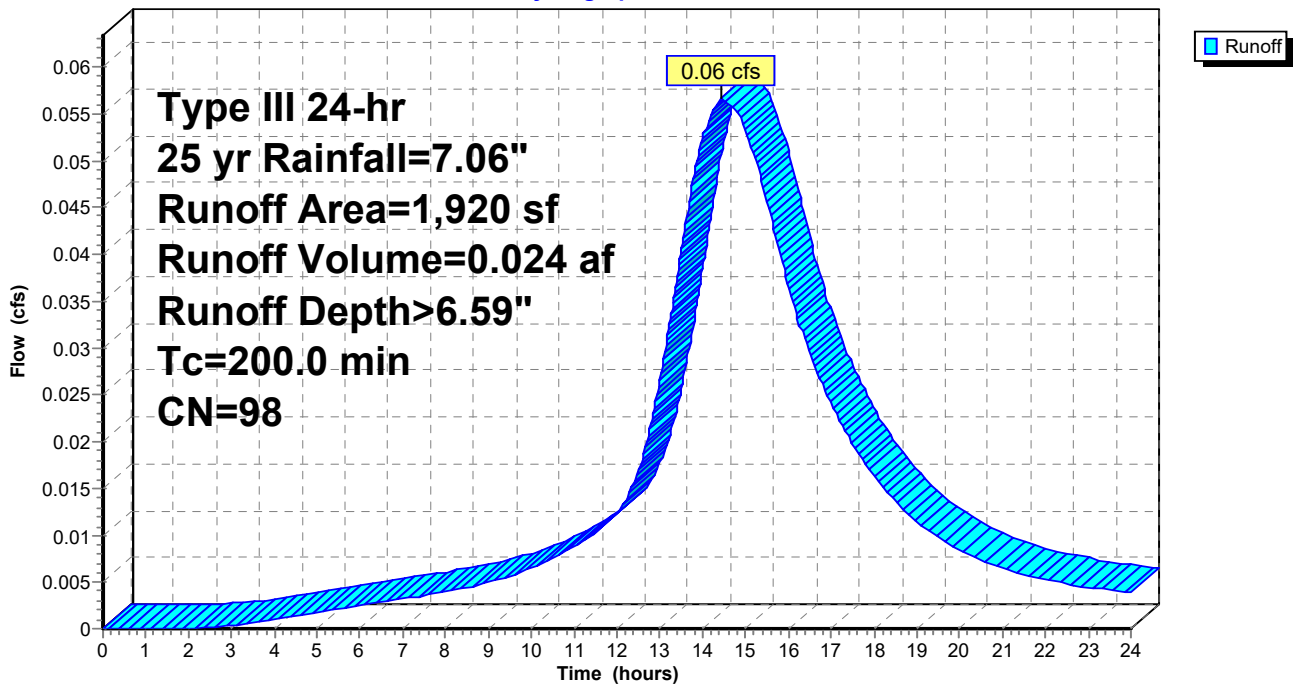
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25 yr Rainfall=7.06"

Area (sf)	CN	Description
1,920	98	Roofs, HSG C
1,920		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
200.0					Direct Entry,

Subcatchment 6S: N Roof

Hydrograph



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Type III 24-hr 25 yr Rainfall=7.06"

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Summary for Subcatchment 7S: N

Runoff = 0.03 cfs @ 14.89 hrs, Volume= 0.013 af, Depth> 1.83"

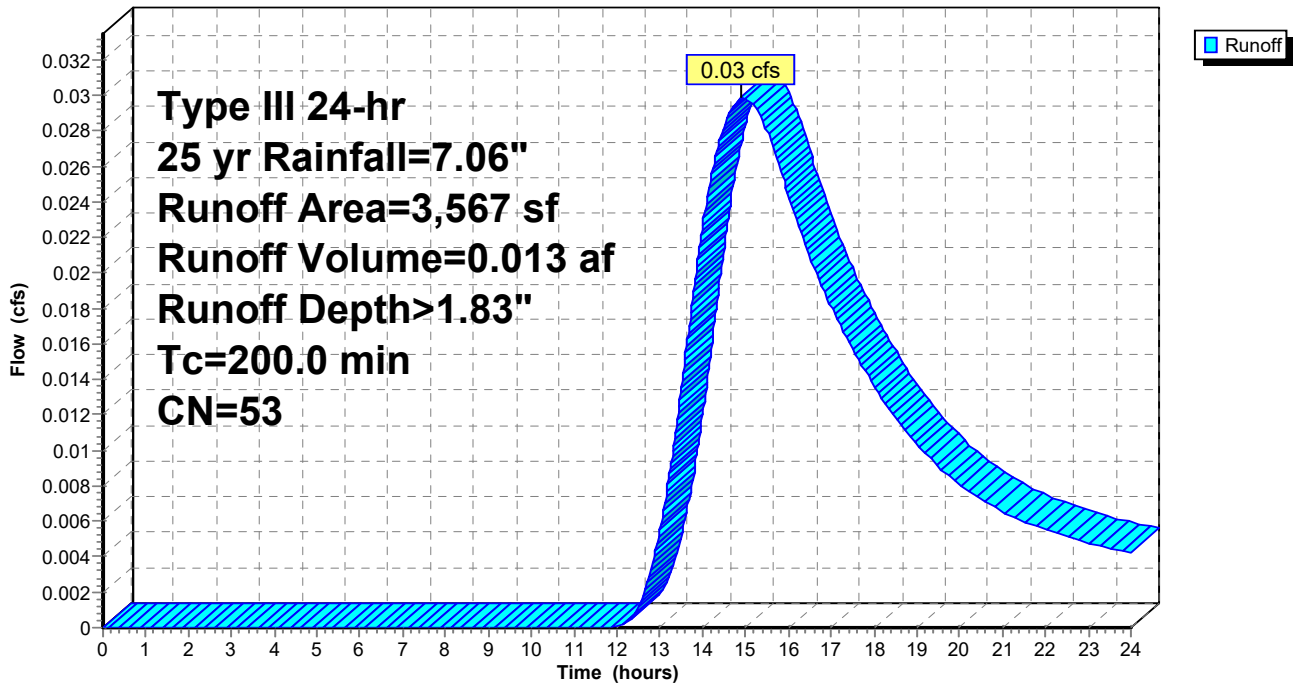
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 25 yr Rainfall=7.06"

Area (sf)	CN	Description
618	98	Paved parking, HSG C
231	74	>75% Grass cover, Good, HSG C
* 2,718	41	Pervious Pavement, HSG C
3,567	53	Weighted Average
2,949		82.67% Pervious Area
618		17.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
200.0					Direct Entry,

Subcatchment 7S: N

Hydrograph



Summary for Reach AP1: AP1

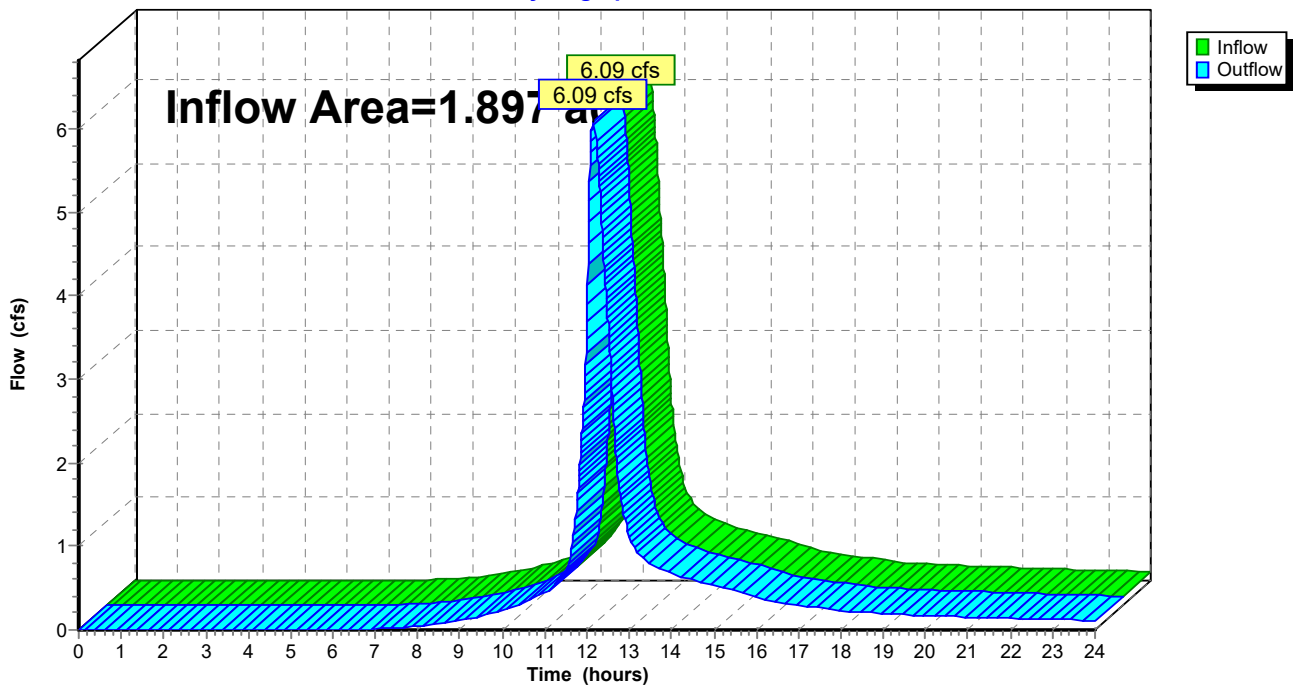
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.897 ac, 22.33% Impervious, Inflow Depth > 4.54" for 25 yr event
Inflow = 6.09 cfs @ 12.15 hrs, Volume= 0.718 af
Outflow = 6.09 cfs @ 12.15 hrs, Volume= 0.718 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Reach AP1: AP1

Hydrograph



Summary for Pond 1P: 18" Culvert

Inflow Area = 1.897 ac, 22.33% Impervious, Inflow Depth > 4.54" for 25 yr event
 Inflow = 6.23 cfs @ 12.11 hrs, Volume= 0.718 af
 Outflow = 6.09 cfs @ 12.15 hrs, Volume= 0.718 af, Atten= 2%, Lag= 2.3 min
 Primary = 6.09 cfs @ 12.15 hrs, Volume= 0.718 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.12'@ 12.15 hrs Surf.Area= 450 sf Storage= 456 cf

Plug-Flow detention time=1.6 min calculated for 0.717 af (100% of inflow)
 Center-of-Mass det. time=1.2 min (824.3 - 823.1)

Volume	Invert	Avail.Storage	Storage Description		
#1	54.25'	957 cf	Custom Stage Data (Irregular) listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.25	20	20.0	0	0	20
55.00	235	90.0	81	81	634
56.00	420	115.0	323	404	1,055
57.00	698	147.0	553	957	1,735

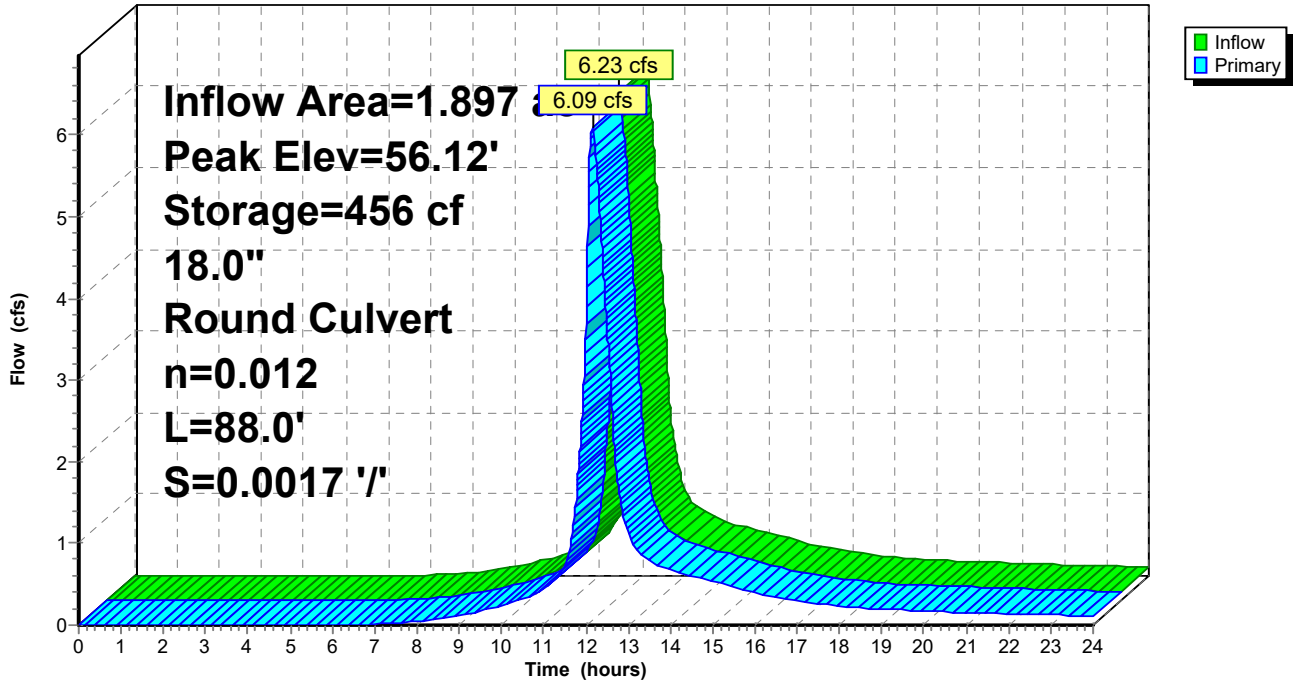
Device	Routing	Invert	Outlet Devices
#1	Primary	54.42'	18.0" Round Culvert L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 54.42' / 54.27' S= 0.0017'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=6.09 cfs @ 12.15 hrs HW=56.12' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Barrel Controls 6.09 cfs @ 3.80 fps)

Pond 1P: 18" Culvert

Hydrograph



Summary for Pond CB A: CB A

[57] Hint: Peaked at 57.42' (Flood elevation advised)

Inflow Area = 0.029 ac, 11.30% Impervious, Inflow Depth > 4.30" for 25 yr event
 Inflow = 0.15 cfs @ 12.08 hrs, Volume= 0.010 af
 Outflow = 0.15 cfs @ 12.08 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.15 cfs @ 12.08 hrs, Volume= 0.010 af

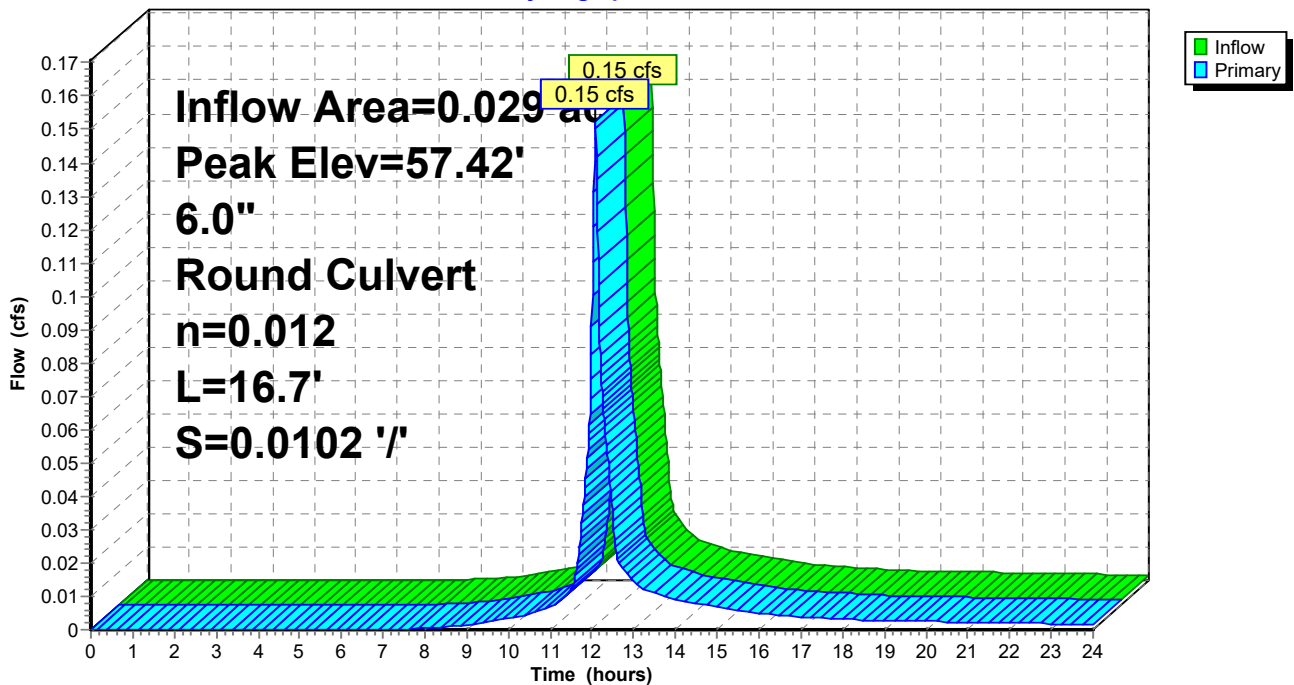
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 57.42'@ 12.08 hrs

Device #	Routing	Invert	Outlet Devices
1	Primary	57.17'	6.0" Round Culvert L= 16.7' Ke= 0.500 Inlet / Outlet Invert= 57.17' / 57.00' S= 0.0102'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.15 cfs @ 12.08 hrs HW=57.42' TW=57.11' (Dynamic Tailwater)
 ↑ 1=Culvert (Barrel Controls 0.15 cfs @ 2.25 fps)

Pond CB A: CB A

Hydrograph



Summary for Pond CB B: CB B

[57] Hint: Peaked at 57.11' (Flood elevation advised)

Inflow Area = 0.029 ac, 11.30% Impervious, Inflow Depth > 4.30" for 25 yr event
 Inflow = 0.15 cfs @ 12.08 hrs, Volume= 0.010 af
 Outflow = 0.15 cfs @ 12.08 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.15 cfs @ 12.08 hrs, Volume= 0.010 af

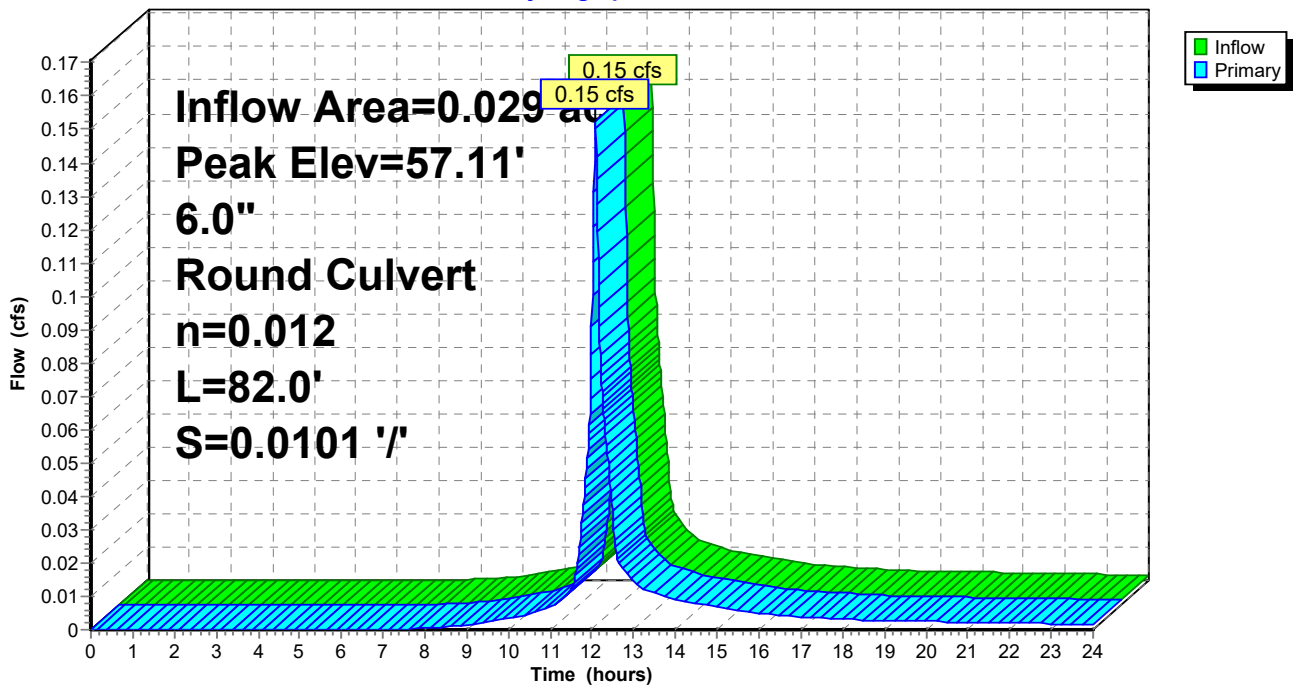
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 57.11'@ 12.09 hrs

Device #	Routing	Invert	Outlet Devices
1	Primary	56.83'	6.0" Round Culvert L= 82.0' Ke= 0.500 Inlet / Outlet Invert= 56.83' / 56.00' S= 0.0101 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.15 cfs @ 12.08 hrs HW=57.11' TW=56.62' (Dynamic Tailwater)
 ↑ 1=Culvert (Outlet Controls 0.15 cfs @ 1.98 fps)

Pond CB B: CB B

Hydrograph



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Type III 24-hr 25 yr Rainfall=7.06"

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Summary for Pond CB C: CB C

[57] Hint: Peaked at 56.39' (Flood elevation advised)

Inflow Area = 0.078 ac, 60.46% Impervious, Inflow Depth > 5.42" for 25 yr event
 Inflow = 0.47 cfs @ 12.09 hrs, Volume= 0.035 af
 Outflow = 0.47 cfs @ 12.09 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.47 cfs @ 12.09 hrs, Volume= 0.035 af

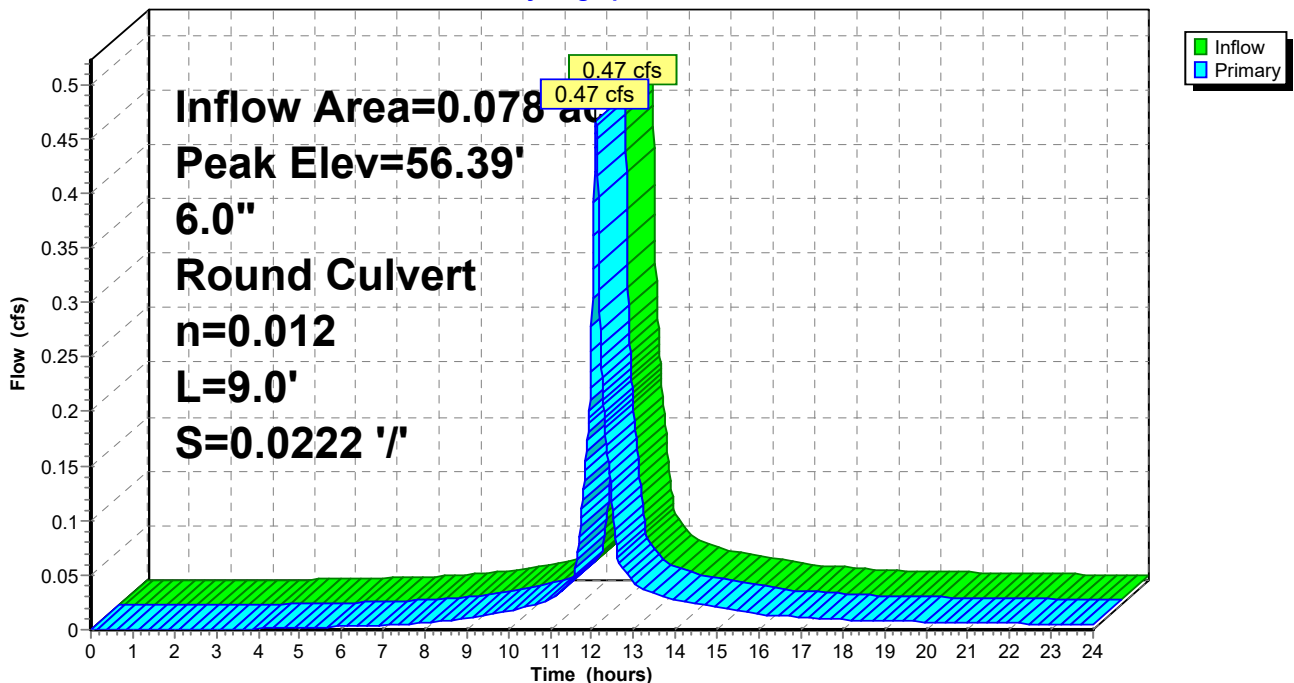
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.39' @ 12.09 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	55.90'	6.0" Round Culvert L= 9.0' Ke= 0.500 Inlet / Outlet Invert= 55.90' / 55.70' S= 0.0222'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.47 cfs @ 12.09 hrs HW=56.39' TW=56.05' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 0.47 cfs @ 2.38 fps)

Pond CB C: CB C

Hydrograph



Summary for Pond ITA: Inf. Trench A

Inflow Area = 0.029 ac, 11.30% Impervious, Inflow Depth > 4.31" for 25 yr event
 Inflow = 0.15 cfs @ 12.07 hrs, Volume= 0.010 af
 Outflow = 0.15 cfs @ 12.08 hrs, Volume= 0.010 af, Atten= 0%, Lag= 0.4 min
 Primary = 0.15 cfs @ 12.08 hrs, Volume= 0.010 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 57.55' @ 12.08 hrs Surf.Area= 0.001 ac Storage= 0.000 af

Plug-Flow detention time=2.3 min calculated for 0.010 af (100% of inflow)
 Center-of-Mass det. time=1.5 min (817.0 - 815.6)

Volume	Invert	Avail.Storage	Storage Description
#1	57.25'	0.001 af	2.00'W x 24.00'L x 3.25'H Prisma-toid 0.004 af Overall x 40.0% Voids

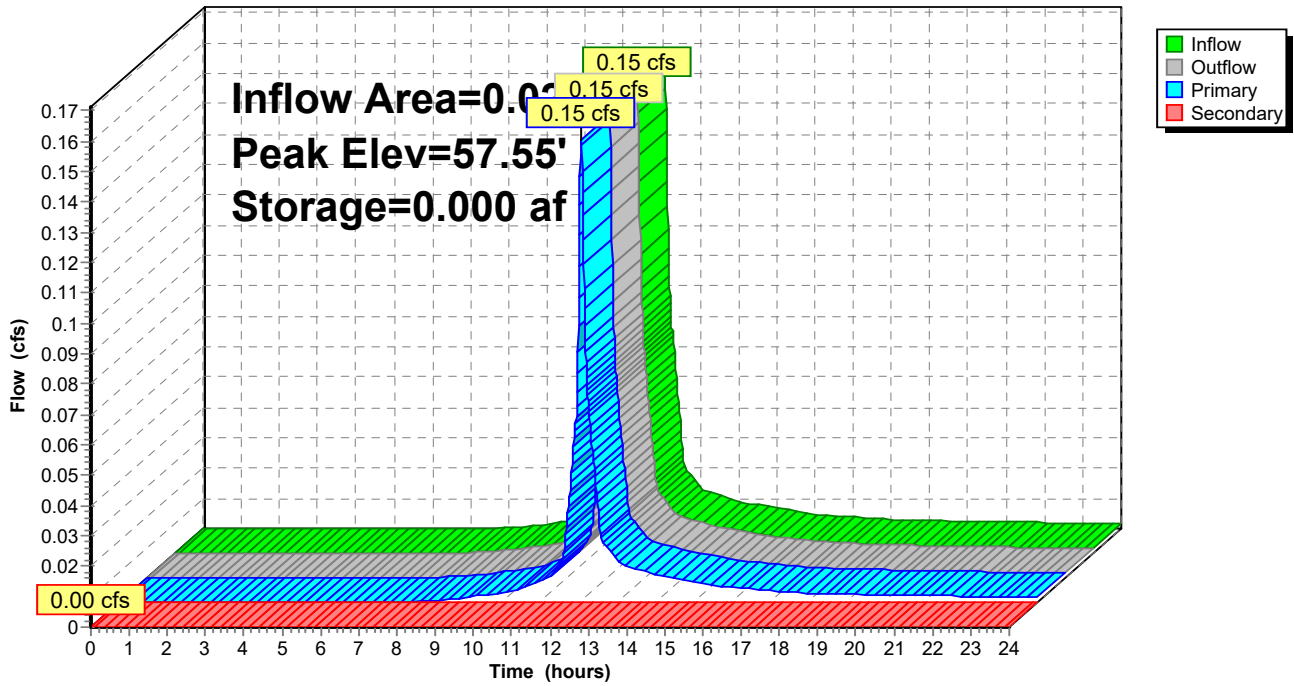
Device	Routing	Invert	Outlet Devices
#1	Primary	57.25'	6.0" Round Culvert L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 57.25' / 57.25' S= 0.0000'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	59.40'	24.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.15 cfs @ 12.08 hrs HW=57.55' TW=57.42' (Dynamic Tailwater)
 ↑1=Culvert (Barrel Controls 0.15 cfs @ 1.76 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.25' TW=57.17' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond ITA: Inf. Trench A

Hydrograph



Summary for Pond ITB: Inf. Trench B

Inflow Area = 0.078 ac, 60.46% Impervious, Inflow Depth > 5.43" for 25 yr event
 Inflow = 0.49 cfs @ 12.07 hrs, Volume= 0.035 af
 Outflow = 0.47 cfs @ 12.09 hrs, Volume= 0.035 af, Atten= 5%, Lag= 1.1 min
 Primary = 0.47 cfs @ 12.09 hrs, Volume= 0.035 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.63' @ 12.10 hrs Surf.Area= 0.004 ac Storage= 0.001 af

Plug-Flow detention time=4.6 min calculated for 0.035 af (100% of inflow)
 Center-of-Mass det. time=3.2 min (787.8 - 784.6)

Volume	Invert	Avail.Storage	Storage Description
#1	56.00'	0.005 af	2.00'W x 82.00'L x 3.00'H Prismatic 0.011 af Overall x 40.0% Voids

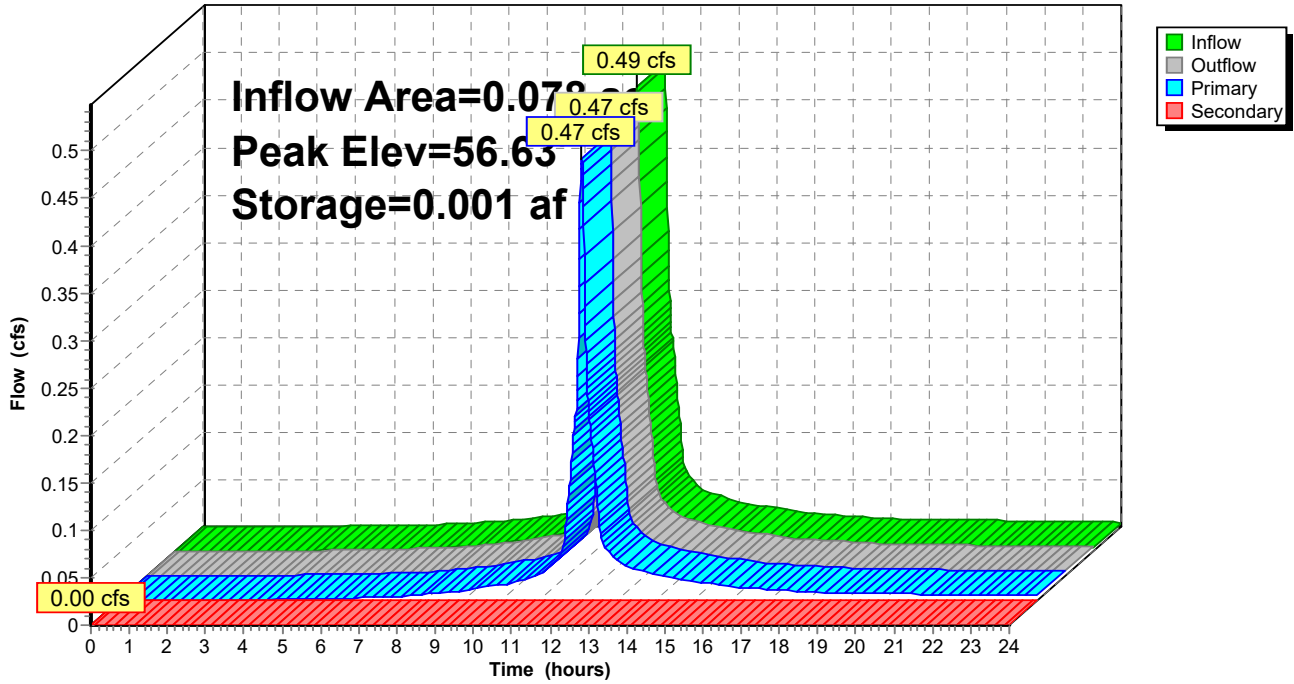
Device	Routing	Invert	Outlet Devices
#1	Primary	56.00'	6.0" Round Culvert L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 56.00' / 56.00' S= 0.0000' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	58.90'	96.5' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.46 cfs @ 12.09 hrs HW=56.63' TW=56.39' (Dynamic Tailwater)
 ↑**1=Culvert** (Inlet Controls 0.46 cfs @ 2.35 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=56.00' TW=55.90' (Dynamic Tailwater)
 ↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond ITB: Inf. Trench B

Hydrograph



Saratoga Way Post 1-7-2021

Type III 24-hr 25 yr Rainfall=7.06"

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Summary for Pond PP: Pervious Pavement

Inflow Area = 0.879 ac, 23.23% Impervious, Inflow Depth > 4.42" for 25 yr event
 Inflow = 3.43 cfs @ 12.07 hrs, Volume= 0.324 af
 Outflow = 2.45 cfs @ 12.13 hrs, Volume= 0.322 af, Atten= 29%, Lag= 3.3 min
 Primary = 2.45 cfs @ 12.13 hrs, Volume= 0.322 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.91'@ 12.18 hrs Surf.Area= 2,718 sf Storage= 1,679 cf

Plug-Flow detention time=14.6 min calculated for 0.322 af (99% of inflow)
 Center-of-Mass det. time=10.9 min (837.7 - 826.8)

Volume	Invert	Avail.Storage	Storage Description
#1	55.00'	2,147 cf	Custom Stage Data (Prismatic) listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.00	2,718	0.0	0	0
55.01	2,718	40.0	11	11
56.42	2,718	40.0	1,533	1,544
56.43	2,718	15.0	4	1,548
56.67	2,718	15.0	98	1,646
56.68	2,718	5.0	1	1,647
57.33	2,718	5.0	88	1,735
57.34	2,718	30.0	8	1,744
57.67	2,718	30.0	269	2,013
57.68	2,718	15.0	4	2,017
58.00	2,718	15.0	130	2,147

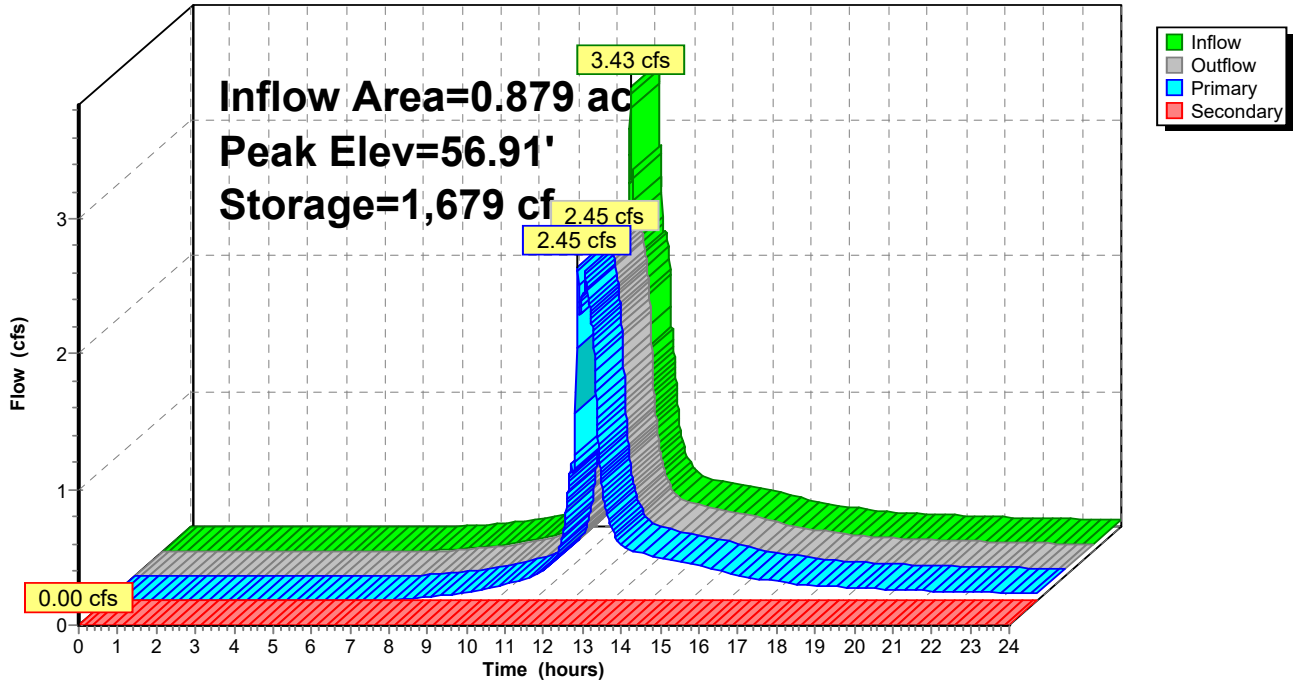
Device	Routing	Invert	Outlet Devices
#1	Primary	55.00'	10.0" Round Culvert X 2.00L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 55.00' / 54.85' S= 0.0150'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.55 sf
#2	Secondary	57.90'	20.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=2.43 cfs @ 12.13 hrs HW=56.81' TW=56.60' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 2.43 cfs @ 2.23 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=55.00' TW=54.69' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PP: Pervious Pavement

Hydrograph



Summary for Pond RG: Rain Garden

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=1)

Inflow Area = 0.753 ac, 19.38% Impervious, Inflow Depth > 4.63" for 25 yr event
 Inflow = 4.10 cfs @ 12.08 hrs, Volume= 0.291 af
 Outflow = 3.42 cfs @ 12.07 hrs, Volume= 0.291 af, Atten= 17%, Lag= 0.0 min
 Primary = 3.42 cfs @ 12.07 hrs, Volume= 0.287 af
 Secondary= 0.56 cfs @ 12.17 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.99'@ 12.17 hrs Surf.Area= 603 sf Storage= 560 cf

Plug-Flow detention time=3.1 min calculated for 0.290 af (100% of inflow)
 Center-of-Mass det. time=2.3 min (811.6 - 809.2)

Volume	Invert	Avail.Storage	Storage Description		
#1	55.20'	811 cf	Custom Stage Data (Conid) isted below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
55.20	607	0.0	0	0	607
55.21	607	40.0	2	2	608
56.50	607	40.0	313	316	721
56.51	400	100.0	5	321	928
57.00	607	100.0	245	566	1,138
57.35	800	100.0	245	811	1,334

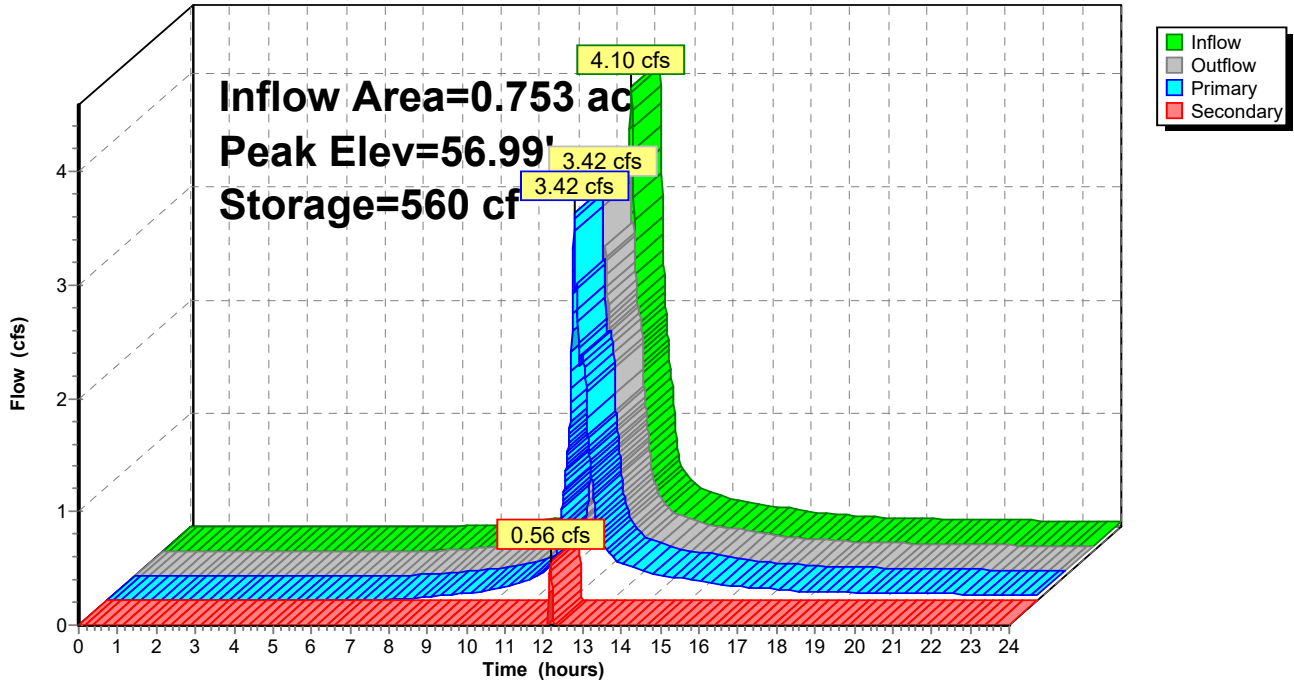
Device	Routing	Invert	Outlet Devices
#1	Secondary	56.90'	8.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Primary	55.20'	10.0" Round Culvert X 3.00L= 5.0' Ke= 0.500 Inlet / Outlet Invert= 55.20' / 55.15' S= 0.0100'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.55 sf

Primary OutFlowMax=3.48 cfs @ 12.07 hrs HW=56.48' TW=56.29' (Dynamic Tailwater)
 ↑**2=Culvert** (Inlet Controls 3.48 cfs @ 2.13 fps)

Secondary OutFlowMax=0.56 cfs @ 12.17 hrs HW=56.99' TW=56.73' (Dynamic Tailwater)
 ↑**1=Broad-Crested Rectangular Weir** (Weir Controls 0.56 cfs @ 0.77 fps)

Pond RG: Rain Garden

Hydrograph



Saratoga Way Post 1-7-2021

Type III 24-hr 25 yr Rainfall=7.06"

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Summary for Pond SDP: Stone Det. Pond

Inflow Area = 1.345 ac, 21.36% Impervious, Inflow Depth > 4.47" for 25 yr event
 Inflow = 4.79 cfs @ 12.15 hrs, Volume= 0.501 af
 Outflow = 4.17 cfs @ 12.21 hrs, Volume= 0.500 af, Atten= 13%, Lag= 3.6 min
 Primary = 4.17 cfs @ 12.21 hrs, Volume= 0.500 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.75'@ 12.19 hrs Surf.Area= 947 sf Storage= 786 cf

Plug-Flow detention time=4.1 min calculated for 0.500 af (100% of inflow)
 Center-of-Mass det. time=3.0 min (830.9 - 827.9)

Volume	Invert	Avail.Storage	Storage Description	
#1	54.69'	2,499 cf	Custom Stage Data (Prismatic) listed below	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
54.69	1	0.0	0	0
54.70	767	40.0	2	2
56.50	767	40.0	552	554
56.51	767	100.0	8	561
57.00	1,140	100.0	467	1,029
58.00	1,800	100.0	1,470	2,499

Device	Routing	Invert	Outlet Devices
#1	Primary	54.70'	15.0" Round Culvert L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 54.70' / 54.50' S= 0.0133'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#2	Secondary	57.25'	5.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Device 1	54.70'	14.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=4.17 cfs @ 12.21 hrs HW=56.73' TW=56.08' (Dynamic Tailwater)

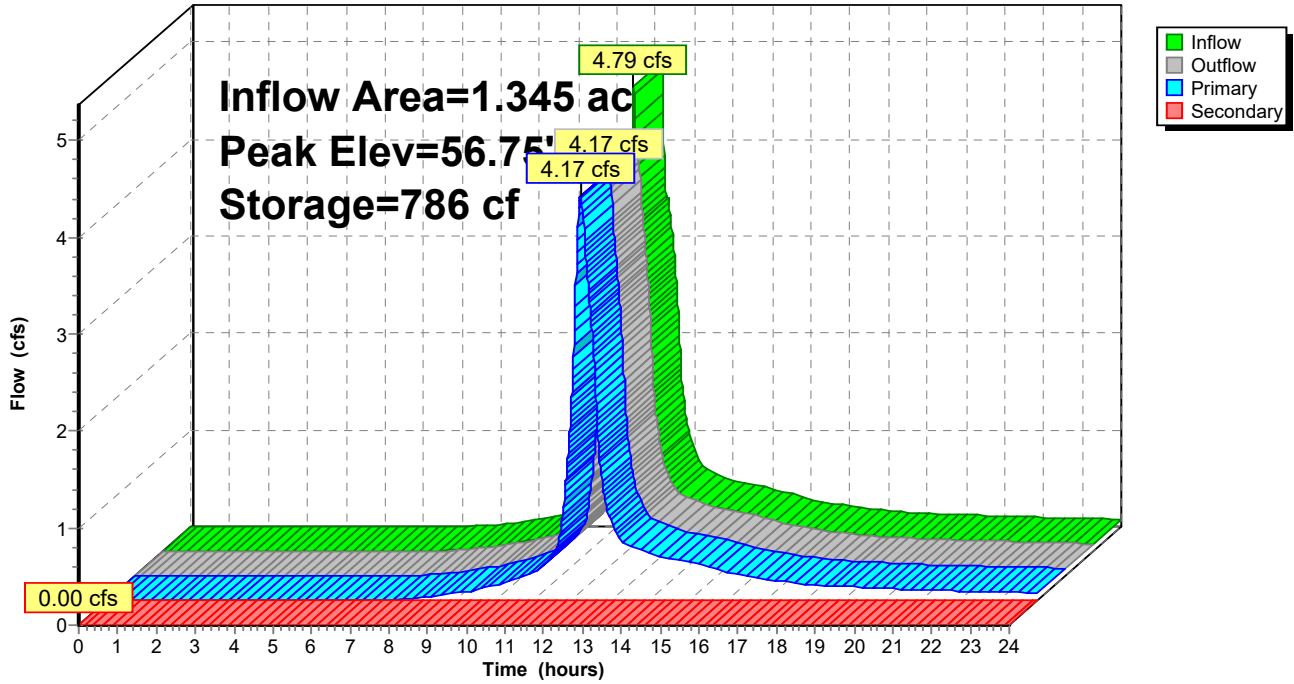
- ↑1=Culvert (Passes 4.17 cfs of 4.79 cfs potential flow)
- ↑3=Orifice/Grate (Orifice Controls 4.17 cfs @ 3.90 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=54.69' TW=54.25' (Dynamic Tailwater)

- ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond SDP: Stone Det. Pond

Hydrograph



Saratoga Way Post 1-7-2021

Type III 24-hr 50 yr Rainfall=8.44"

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points x 3
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: SW	Runoff Area=20,610 sf 18.76% Impervious Runoff Depth>5.91" Tc=5.0 min CN=79 Runoff=3.35 cfs 0.233 af
Subcatchment2S: N	Runoff Area=20,291 sf 17.84% Impervious Runoff Depth>5.79" Flow Length=278' Tc=6.1 min CN=78 Runoff=3.12 cfs 0.225 af
Subcatchment3S: N	Runoff Area=32,810 sf 19.38% Impervious Runoff Depth>5.91" Flow Length=279' Tc=5.8 min CN=79 Runoff=5.18 cfs 0.371 af
Subcatchment4S: S HouseRoof	Runoff Area=2,140 sf 89.72% Impervious Runoff Depth>7.47" Tc=5.0 min CN=92 Runoff=0.41 cfs 0.031 af
Subcatchment5S: SE	Runoff Area=1,274 sf 11.30% Impervious Runoff Depth>5.56" Tc=5.0 min CN=76 Runoff=0.20 cfs 0.014 af
Subcatchment6S: N Roof	Runoff Area=1,920 sf 100.00% Impervious Runoff Depth>7.92" Tc=200.0 min CN=98 Runoff=0.07 cfs 0.029 af
Subcatchment7S: N	Runoff Area=3,567 sf 17.33% Impervious Runoff Depth>2.67" Tc=200.0 min CN=53 Runoff=0.04 cfs 0.018 af
ReachAP1: AP1	Inflow=7.16 cfs 0.916 af Outflow=7.16 cfs 0.916 af
Pond 1P: 18" Culvert	Peak Elev=56.50' Storage=647 cf Inflow=7.59 cfs 0.917 af 18.0" Round Culvert n=0.012 L=88.0' S=0.0017 '/' Outflow=7.16 cfs 0.916 af
Pond CB A: CB A	Peak Elev=57.46' Inflow=0.20 cfs 0.014 af 6.0" Round Culvert n=0.012 L=16.7' S=0.0102 '/' Outflow=0.20 cfs 0.014 af
Pond CB B: CB B	Peak Elev=57.21' Inflow=0.20 cfs 0.014 af 6.0" Round Culvert n=0.012 L=82.0' S=0.0101 '/' Outflow=0.20 cfs 0.014 af
Pond CB C: CB C	Peak Elev=56.74' Inflow=0.51 cfs 0.044 af 6.0" Round Culvert n=0.012 L=9.0' S=0.0222 '/' Outflow=0.51 cfs 0.044 af
Pond ITA: Inf. TrenchA	Peak Elev=57.60' Storage=0.000 af Inflow=0.20 cfs 0.014 af Primary=0.20 cfs 0.014 af Secondary=0.00 cfs 0.000 af Outflow=0.20 cfs 0.014 af
Pond ITB: Inf. TrenchB	Peak Elev=57.00' Storage=0.001 af Inflow=0.60 cfs 0.044 af Primary=0.51 cfs 0.044 af Secondary=0.00 cfs 0.000 af Outflow=0.51 cfs 0.044 af
Pond PP: PerviousPavement	Peak Elev=57.33' Storage=1,736 cf Inflow=3.46 cfs 0.367 af Primary=2.58 cfs 0.365 af Secondary=0.00 cfs 0.000 af Outflow=2.58 cfs 0.365 af
Pond RG: Rain Garden	Peak Elev=57.34' Storage=802 cf Inflow=5.18 cfs 0.371 af Primary=3.45 cfs 0.320 af Secondary=2.66 cfs 0.051 af Outflow=4.40 cfs 0.371 af

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Type III 24-hr 50 yr Rainfall=8.44"

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Pond SDP: Stone Det. Pond

Peak Elev=57.31' Storage=1,489 cf Inflow=7.20 cfs 0.641 af
Primary=4.83 cfs 0.638 af Secondary=0.22 cfs 0.001 af Outflow=4.89 cfs 0.640 af

Total Runoff Area = 1.897 ac Runoff Volume = 0.921 af Average Runoff Depth = 5.83"
77.67% Pervious = 1.473 ac 22.33% Impervious = 0.423 ac

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Type III 24-hr 50 yr Rainfall=8.44"

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Summary for Subcatchment 1S: SW

Runoff = 3.35 cfs @ 12.07 hrs, Volume= 0.233 af, Depth> 5.91"

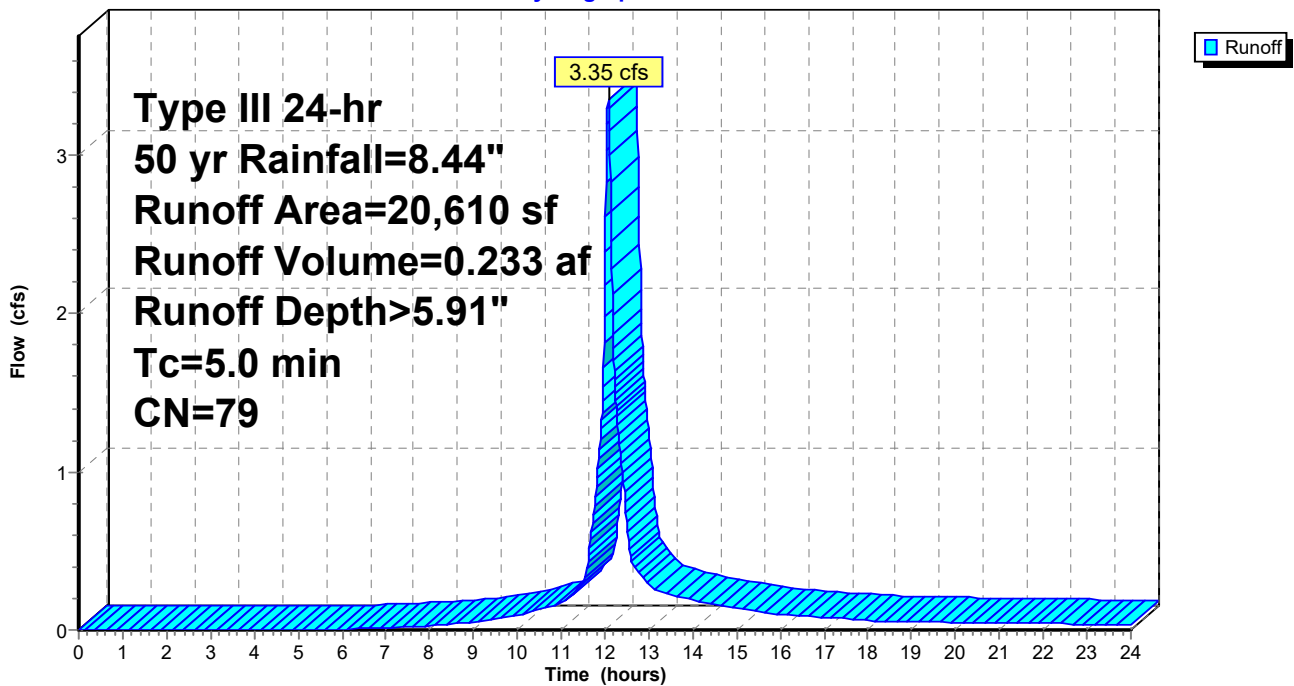
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 50 yr Rainfall=8.44"

Area (sf)	CN	Description
17,964	79	1 acre lots, 20% imp, HSG C
* 220	98	deck, HSG C
* 54	98	retaining wall, HSG C
2,372	74	>75% Grass cover, Good, HSG C
20,610	79	Weighted Average
16,743		81.24% Pervious Area
3,867		18.76% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 1S: SW

Hydrograph



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Type III 24-hr 50 yr Rainfall=8.44"

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Summary for Subcatchment 2S: N

Runoff = 3.12 cfs @ 12.09 hrs, Volume= 0.225 af, Depth> 5.79"

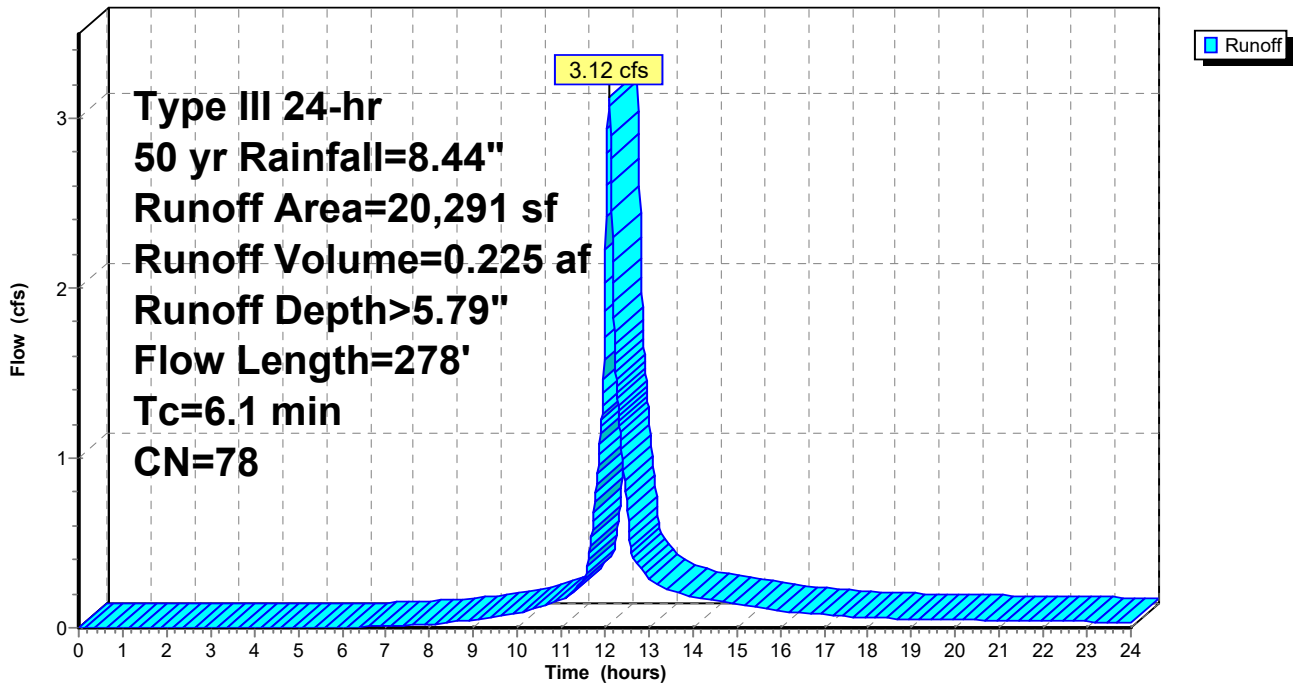
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 50 yr Rainfall=8.44"

Area (sf)	CN	Description
18,097	79	1 acre lots, 20% imp, HSG C
1,486	74	>75% Grass cover, Good, HSG C
* 708	55	Stone Detention Pond, HSG C
20,291	78	Weighted Average
16,672		82.16% Pervious Area
3,619		17.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.2	50	0.0200	0.16		Sheet Flow, Grass: Short n= 0.150 P2= 3.68"
0.9	228	0.0750	4.11		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
6.1	278	Total			

Subcatchment 2S: N

Hydrograph



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Type III 24-hr 50 yr Rainfall=8.44"

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Summary for Subcatchment 3S: N

Runoff = 5.18 cfs @ 12.08 hrs, Volume= 0.371 af, Depth> 5.91"

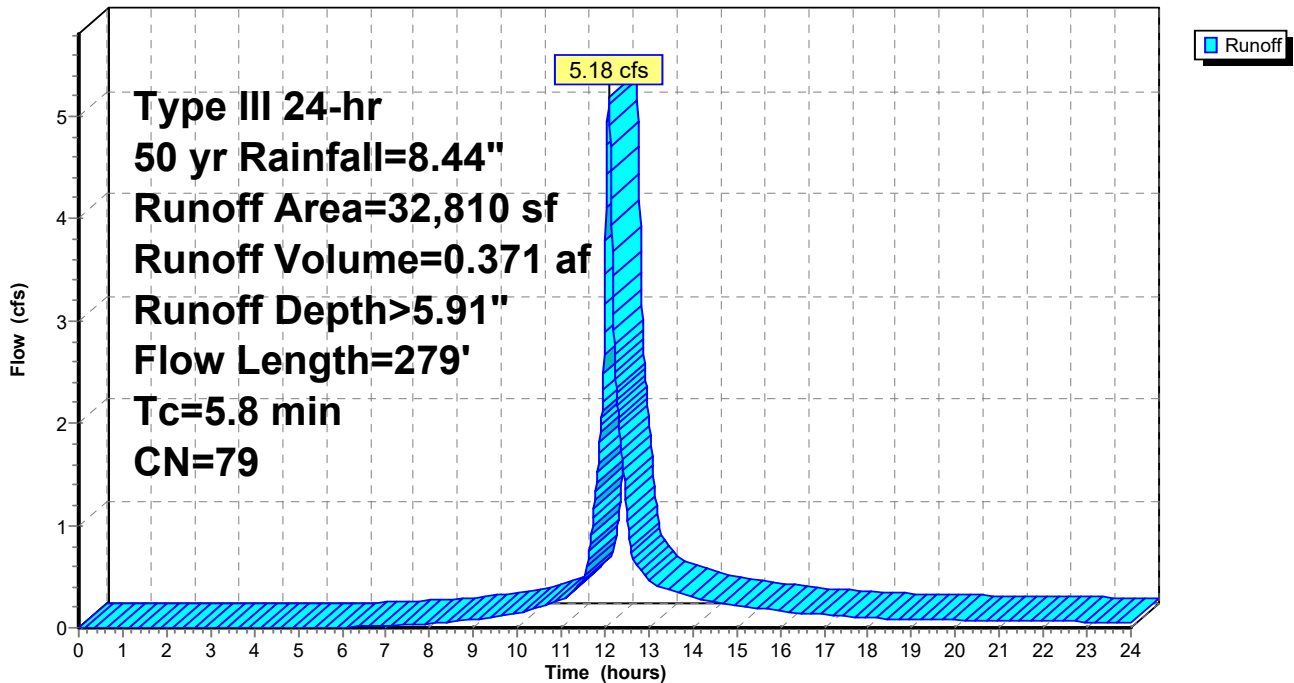
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 50 yr Rainfall=8.44"

Area (sf)	CN	Description
31,402	79	1 acre lots, 20% imp, HSG C
1,329	74	>75% Grass cover, Good, HSG C
* 79	98	Retaining Wall, HSG C
32,810	79	Weighted Average
26,451		80.62% Pervious Area
6,359		19.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0250	0.17		Sheet Flow, Grass: Short n= 0.150 P2= 3.68"
1.0	229	0.0600	3.67		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
5.8	279	Total			

Subcatchment 3S: N

Hydrograph



Summary for Subcatchment 4S: S House Roof

Runoff = 0.41 cfs @ 12.07 hrs, Volume= 0.031 af, Depth> 7.47"

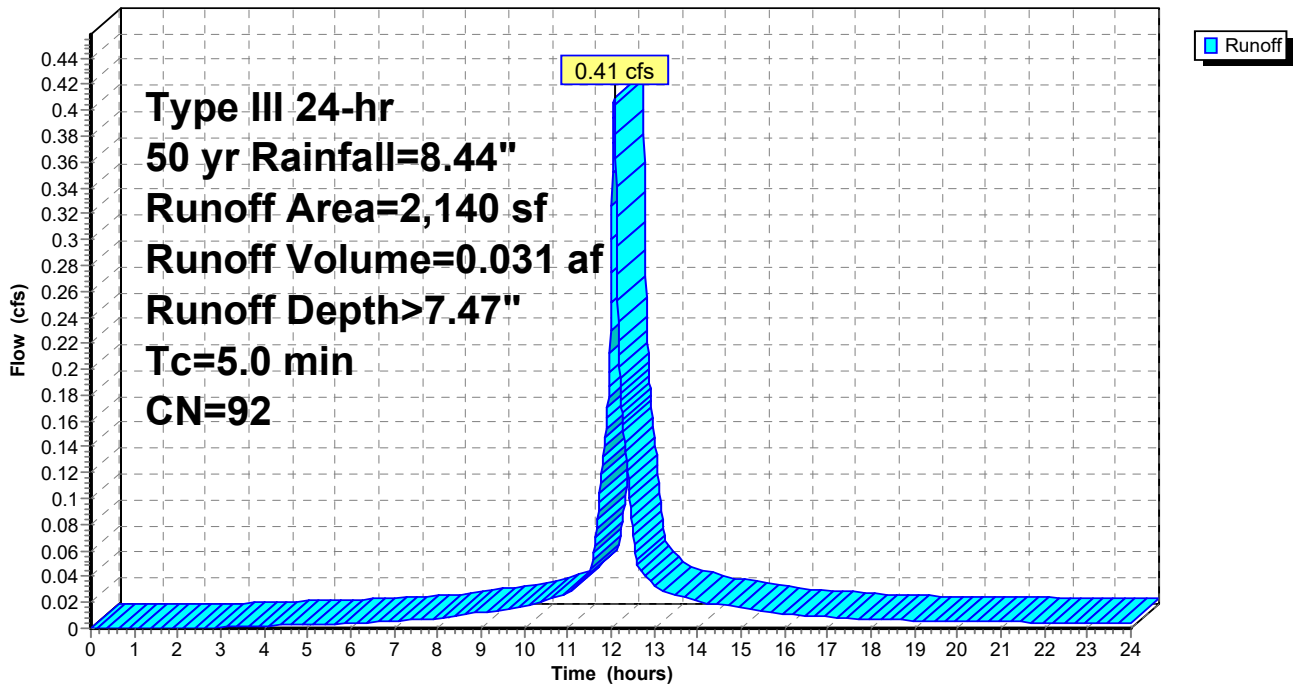
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 50 yr Rainfall=8.44"

Area (sf)	CN	Description
1,920	98	Roofs, HSG C
* 220	41	Infiltration Trench, HSG C
2,140	92	Weighted Average
220		10.28% Pervious Area
1,920		89.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 4S: S House Roof

Hydrograph



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Type III 24-hr 50 yr Rainfall=8.44"

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Summary for Subcatchment 5S: SE

Runoff = 0.20 cfs @ 12.07 hrs, Volume= 0.014 af, Depth> 5.56"

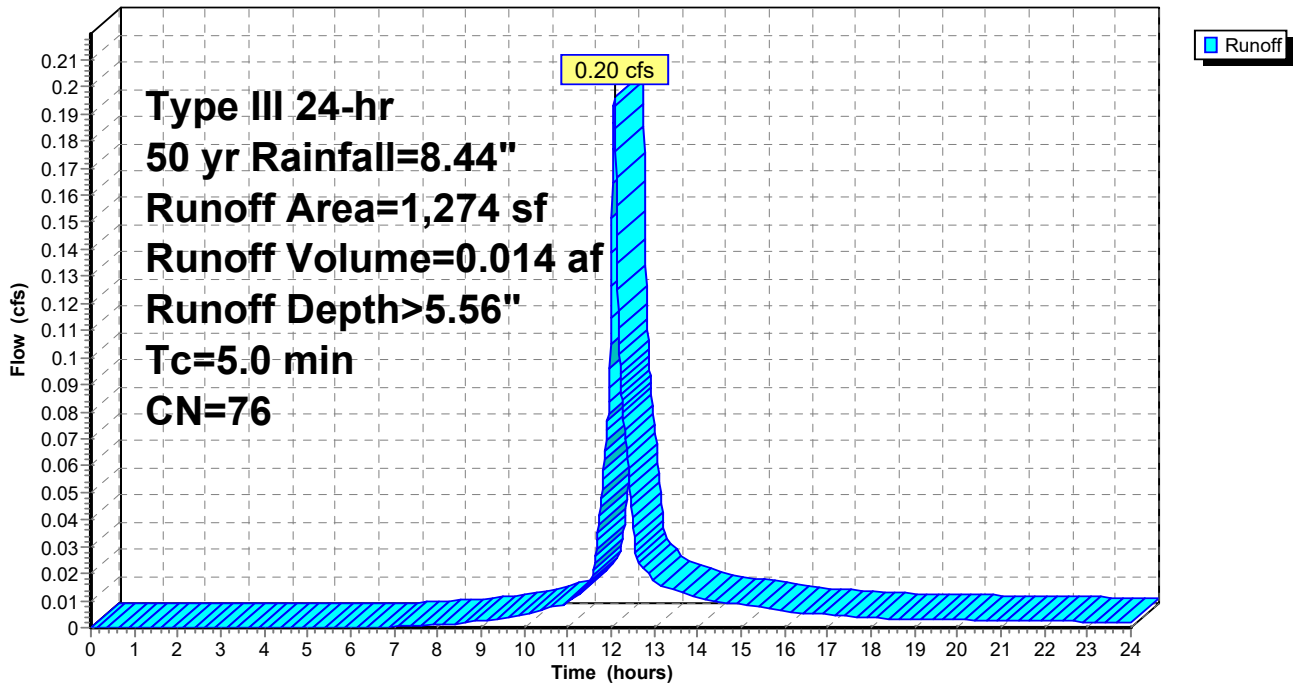
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 50 yr Rainfall=8.44"

	Area (sf)	CN	Description
	1,082	74	>75% Grass cover, Good, HSG C
*	144	98	Deck, HSG C
*	48	48	Infiltration Trench, HSG C
	1,274	76	Weighted Average
	1,130		88.70% Pervious Area
	144		11.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5S: SE

Hydrograph



Summary for Subcatchment 6S: N Roof

Runoff = 0.07 cfs @ 14.45 hrs, Volume= 0.029 af, Depth> 7.92"

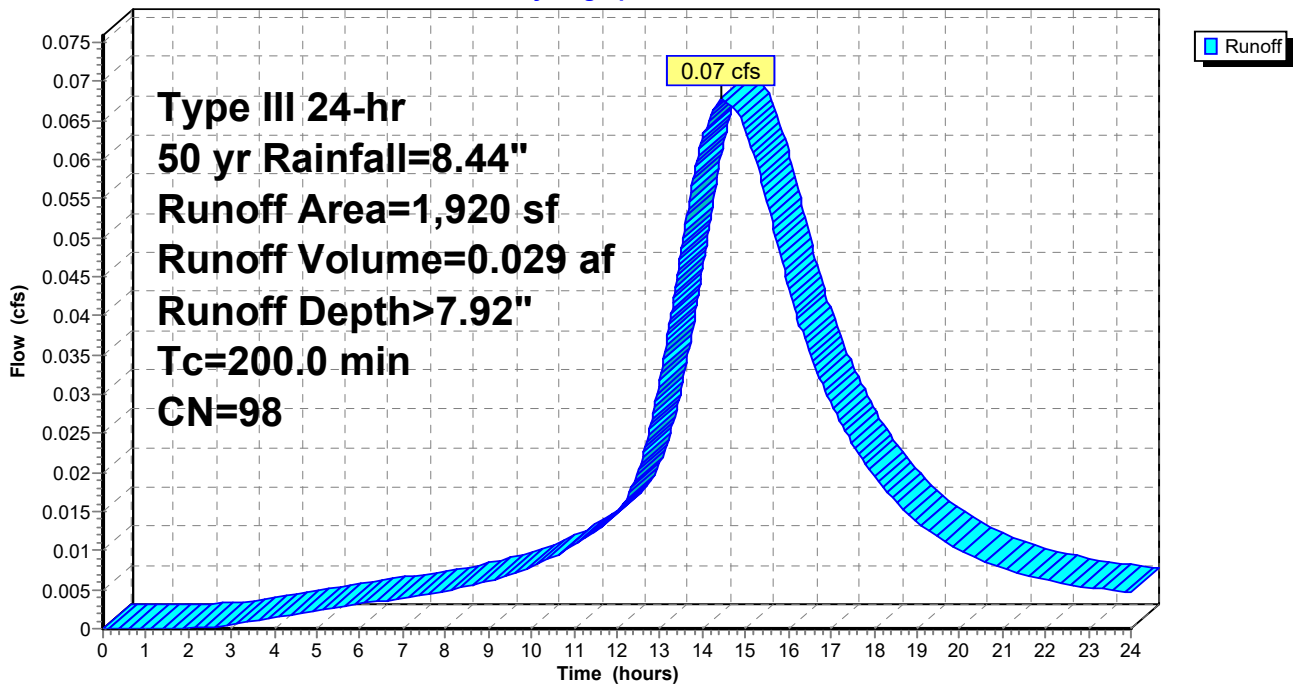
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 50 yr Rainfall=8.44"

Area (sf)	CN	Description
1,920	98	Roofs, HSG C
1,920		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
200.0					Direct Entry,

Subcatchment 6S: N Roof

Hydrograph



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Type III 24-hr 50 yr Rainfall=8.44"

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Summary for Subcatchment 7S: N

Runoff = 0.04 cfs @ 14.89 hrs, Volume= 0.018 af, Depth> 2.67"

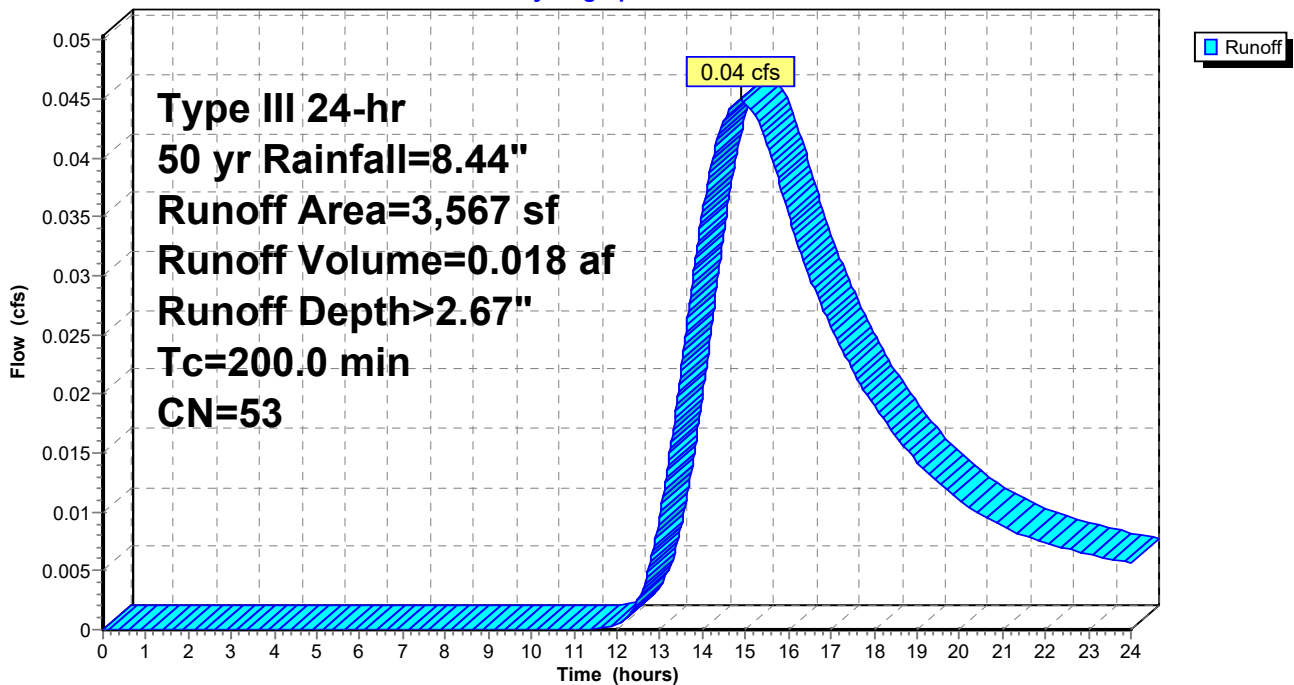
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type III 24-hr 50 yr Rainfall=8.44"

Area (sf)	CN	Description
618	98	Paved parking, HSG C
231	74	>75% Grass cover, Good, HSG C
* 2,718	41	Pervious Pavement, HSG C
3,567	53	Weighted Average
2,949		82.67% Pervious Area
618		17.33% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
200.0					Direct Entry,

Subcatchment 7S: N

Hydrograph



Summary for Reach AP1: AP1

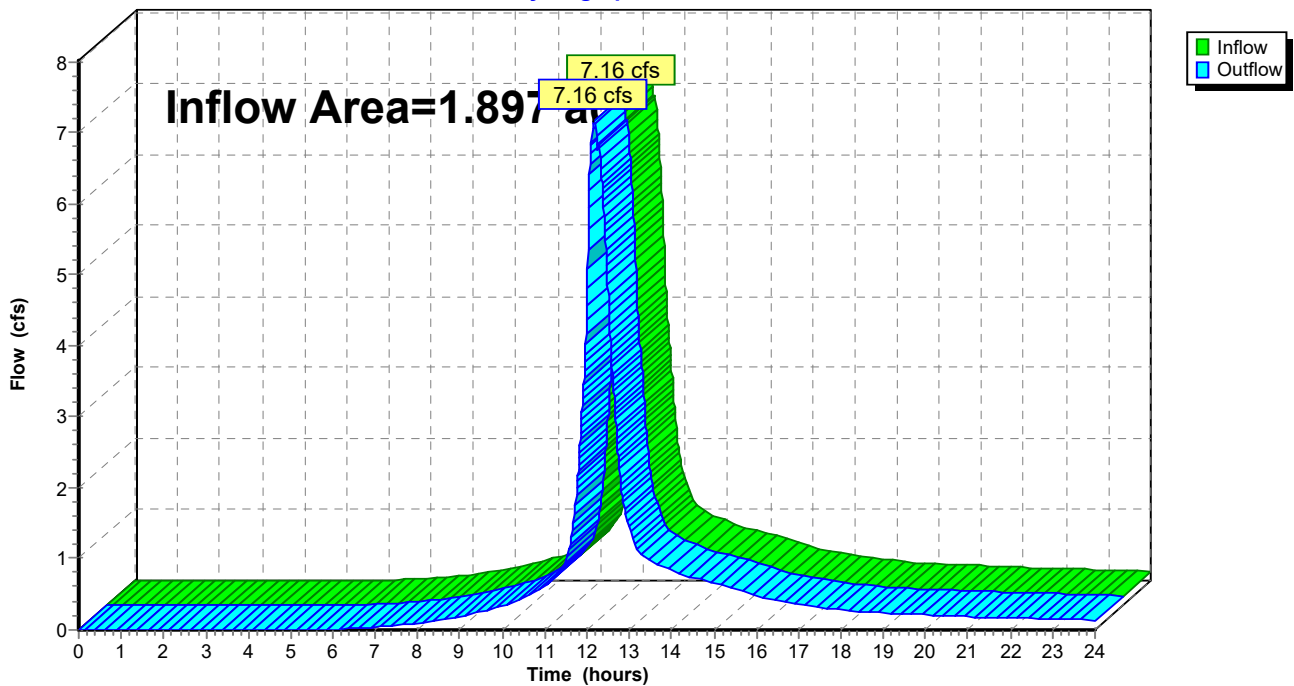
[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.897 ac, 22.33% Impervious, Inflow Depth > 5.80" for 50 yr event
Inflow = 7.16 cfs @ 12.16 hrs, Volume= 0.916 af
Outflow = 7.16 cfs @ 12.16 hrs, Volume= 0.916 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3

Reach AP1: AP1

Hydrograph



Summary for Pond 1P: 18" Culvert

Inflow Area = 1.897 ac, 22.33% Impervious, Inflow Depth > 5.80" for 50 yr event
 Inflow = 7.59 cfs @ 12.10 hrs, Volume= 0.917 af
 Outflow = 7.16 cfs @ 12.16 hrs, Volume= 0.916 af, Atten= 6%, Lag= 3.3 min
 Primary = 7.16 cfs @ 12.16 hrs, Volume= 0.916 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.50'@ 12.16 hrs Surf.Area= 551 sf Storage= 647 cf

Plug-Flow detention time=1.6 min calculated for 0.916 af (100% of inflow)
 Center-of-Mass det. time=1.2 min (818.0 - 816.7)

Volume	Invert	Avail.Storage	Storage Description		
#1	54.25'	957 cf	Custom Stage Data (Irregular) listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
54.25	20	20.0	0	0	20
55.00	235	90.0	81	81	634
56.00	420	115.0	323	404	1,055
57.00	698	147.0	553	957	1,735

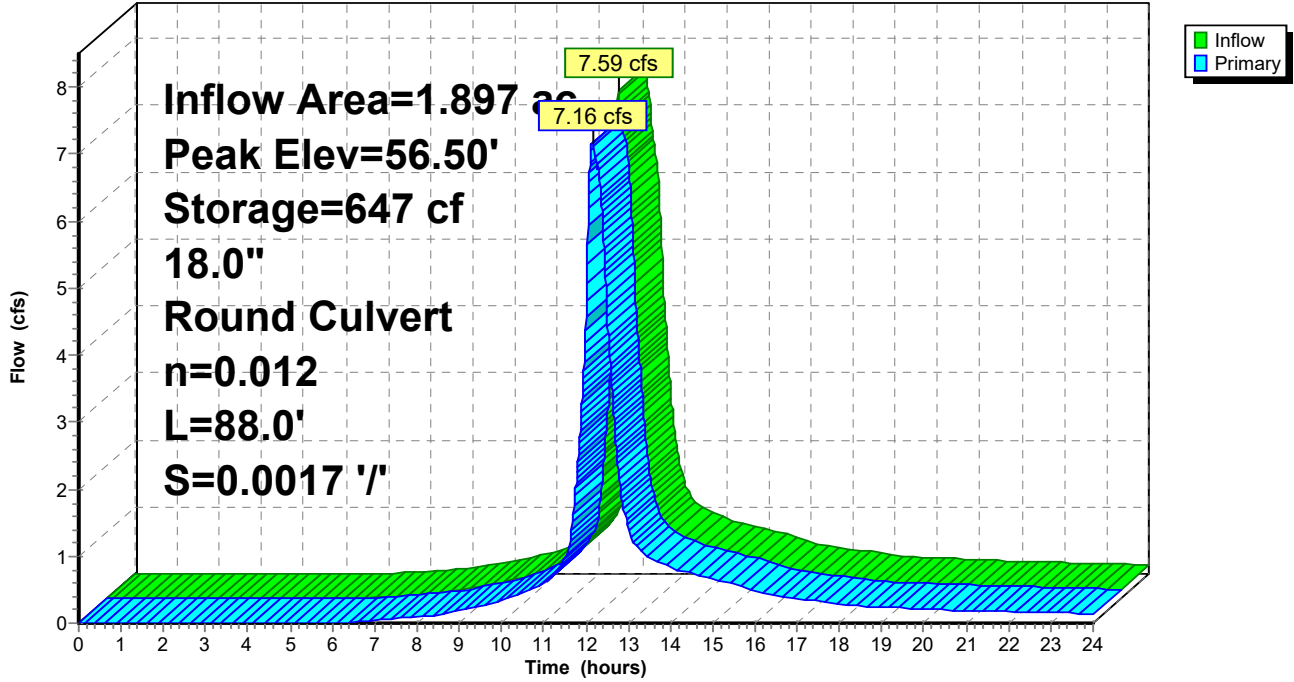
Device	Routing	Invert	Outlet Devices
#1	Primary	54.42'	18.0" Round Culvert L= 88.0' Ke= 0.500 Inlet / Outlet Invert= 54.42' / 54.27' S= 0.0017'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=7.16 cfs @ 12.16 hrs HW=56.50' TW=0.00' (Dynamic Tailwater)

↑ **1=Culvert** (Barrel Controls 7.16 cfs @ 4.05 fps)

Pond 1P: 18" Culvert

Hydrograph



Summary for Pond CB A: CB A

[57] Hint: Peaked at 57.46' (Flood elevation advised)

Inflow Area = 0.029 ac, 11.30% Impervious, Inflow Depth > 5.55" for 50 yr event
 Inflow = 0.20 cfs @ 12.08 hrs, Volume= 0.014 af
 Outflow = 0.20 cfs @ 12.08 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.20 cfs @ 12.08 hrs, Volume= 0.014 af

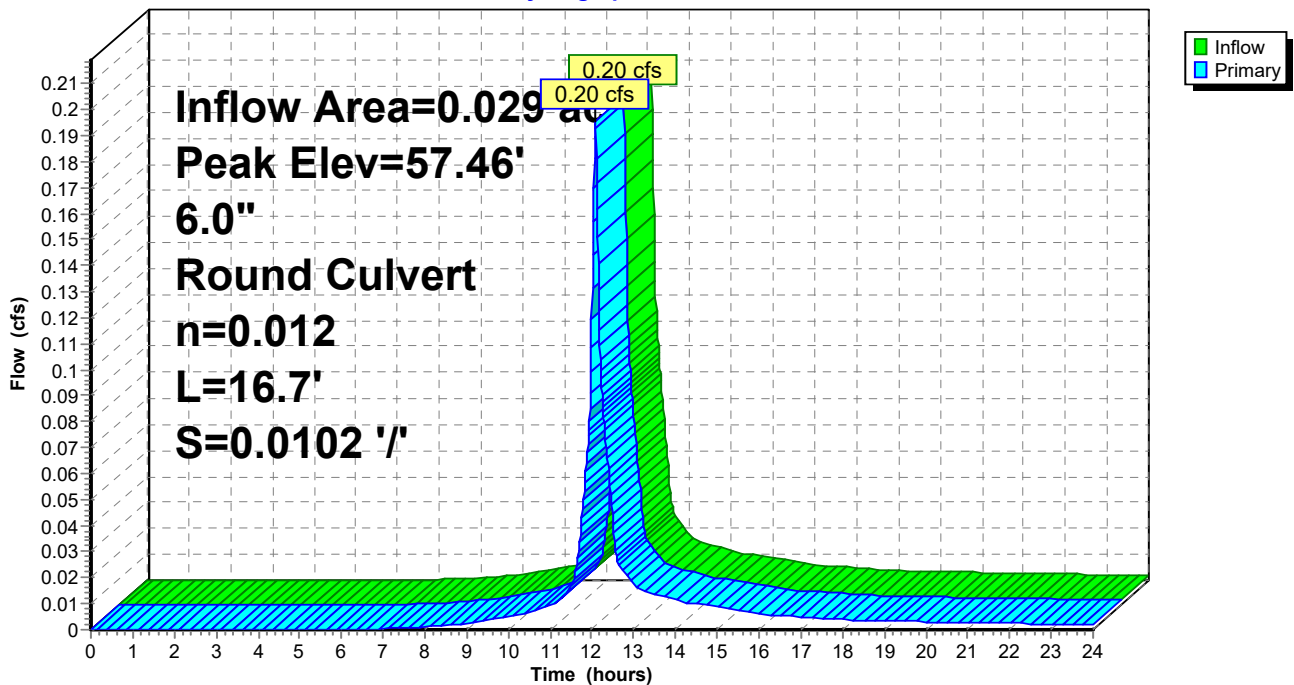
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 57.46'@ 12.08 hrs

Device #	Routing	Invert	Outlet Devices
1	Primary	57.17'	6.0" Round Culvert L= 16.7' Ke= 0.500 Inlet / Outlet Invert= 57.17' / 57.00' S= 0.0102'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.20 cfs @ 12.08 hrs HW=57.46' TW=57.18' (Dynamic Tailwater)
 ↑ 1=Culvert (Barrel Controls 0.20 cfs @ 2.37 fps)

Pond CB A: CB A

Hydrograph



Summary for Pond CB B: CB B

[57] Hint: Peaked at 57.21' (Flood elevation advised)

Inflow Area = 0.029 ac, 11.30% Impervious, Inflow Depth > 5.55" for 50 yr event
 Inflow = 0.20 cfs @ 12.08 hrs, Volume= 0.014 af
 Outflow = 0.20 cfs @ 12.08 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.20 cfs @ 12.08 hrs, Volume= 0.014 af

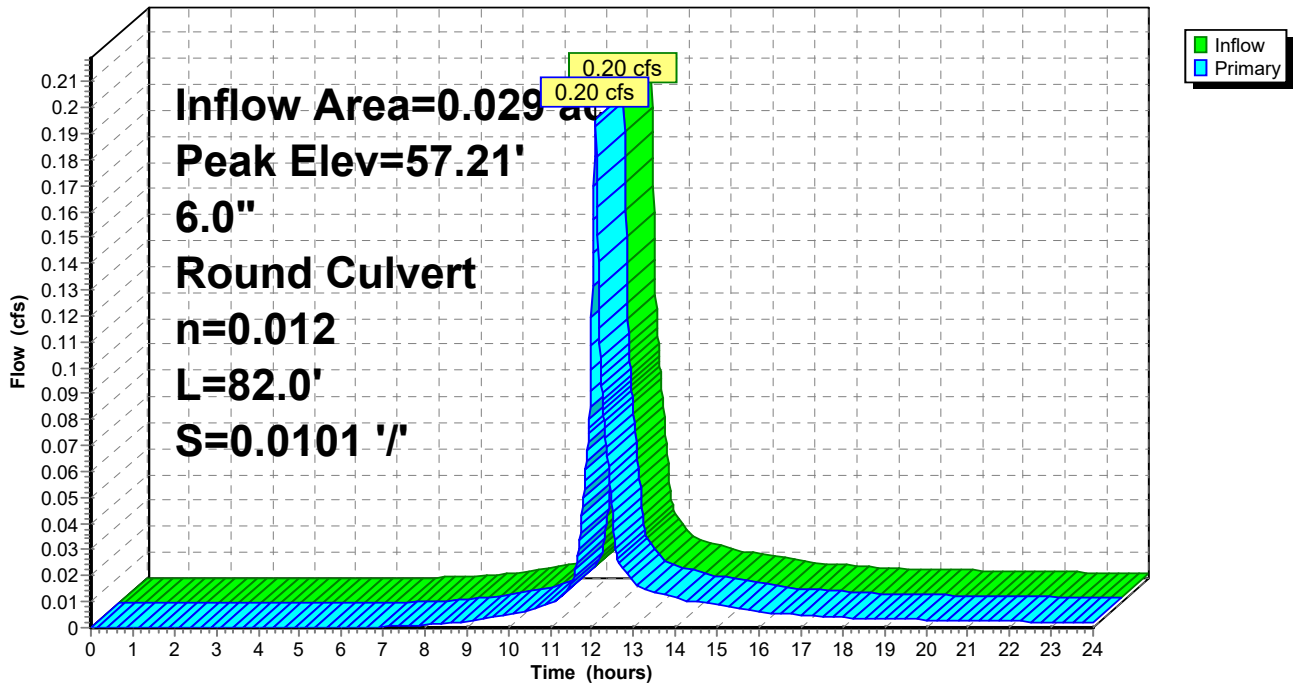
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 57.21'@ 12.12 hrs

Device #	Routing	Invert	Outlet Devices
1	Primary	56.83'	6.0" Round Culvert L= 82.0' Ke= 0.500 Inlet / Outlet Invert= 56.83' / 56.00' S= 0.0101 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlowMax=0.20 cfs @ 12.08 hrs HW=57.18' TW=56.82' (Dynamic Tailwater)
 ↑1=Culvert (Outlet Controls 0.20 cfs @ 1.86 fps)

Pond CB B: CB B

Hydrograph



Summary for Pond CB C: CB C

[57] Hint: Peaked at 56.74' (Flood elevation advised)

Inflow Area = 0.078 ac, 60.46% Impervious, Inflow Depth > 6.74" for 50 yr event
 Inflow = 0.51 cfs @ 12.08 hrs, Volume= 0.044 af
 Outflow = 0.51 cfs @ 12.08 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min
 Primary = 0.51 cfs @ 12.08 hrs, Volume= 0.044 af

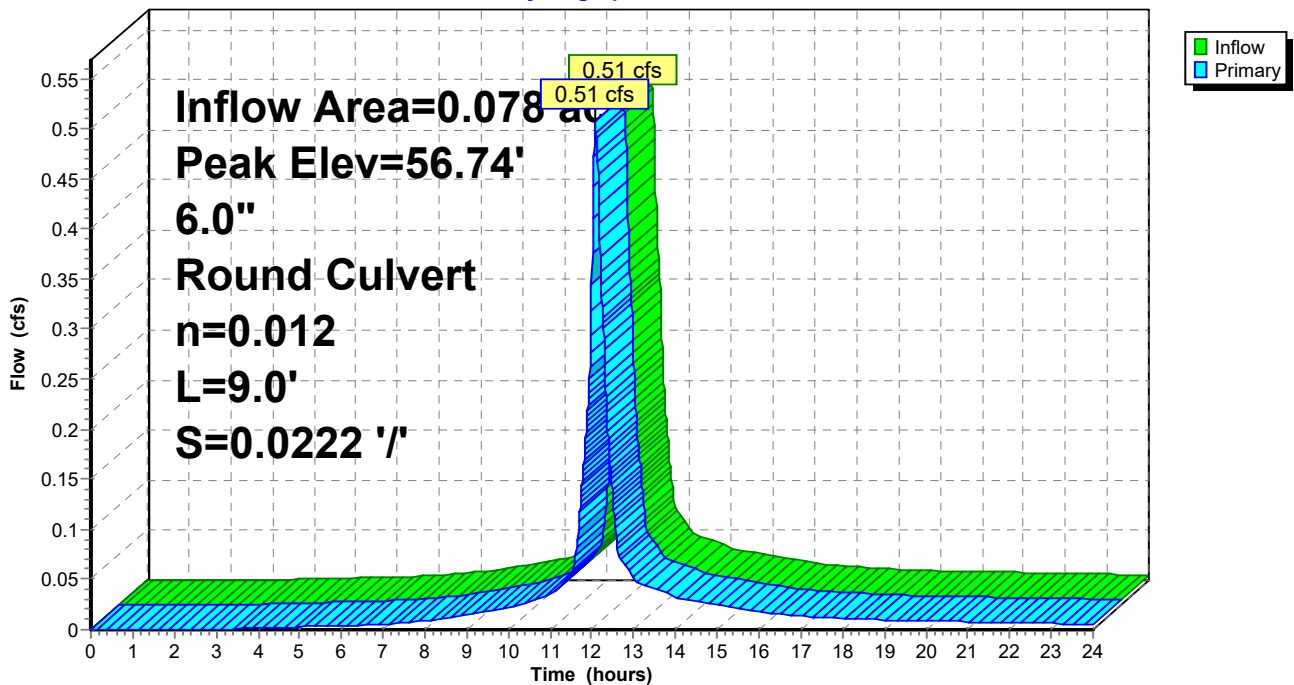
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 56.74' @ 12.14 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	55.90'	6.0" Round Culvert L= 9.0' Ke= 0.500 Inlet / Outlet Invert= 55.90' / 55.70' S= 0.0222'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf

Primary OutFlow Max=0.51 cfs @ 12.08 hrs HW=56.54' TW=56.25' (Dynamic Tailwater)
 ↑ **1=Culvert** (Inlet Controls 0.51 cfs @ 2.58 fps)

Pond CB C: CB C

Hydrograph



Summary for Pond ITA: Inf. Trench A

Inflow Area = 0.029 ac, 11.30% Impervious, Inflow Depth > 5.56" for 50 yr event
 Inflow = 0.20 cfs @ 12.07 hrs, Volume= 0.014 af
 Outflow = 0.20 cfs @ 12.08 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.3 min
 Primary = 0.20 cfs @ 12.08 hrs, Volume= 0.014 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 57.60' @ 12.08 hrs Surf.Area= 0.001 ac Storage= 0.000 af

Plug-Flow detention time=2.0 min calculated for 0.014 af (100% of inflow)
 Center-of-Mass det. time=1.3 min (809.7 - 808.3)

Volume	Invert	Avail.Storage	Storage Description
#1	57.25'	0.001 af	2.00'W x 24.00'L x 3.25'H Prismatic 0.004 af Overall x 40.0% Voids

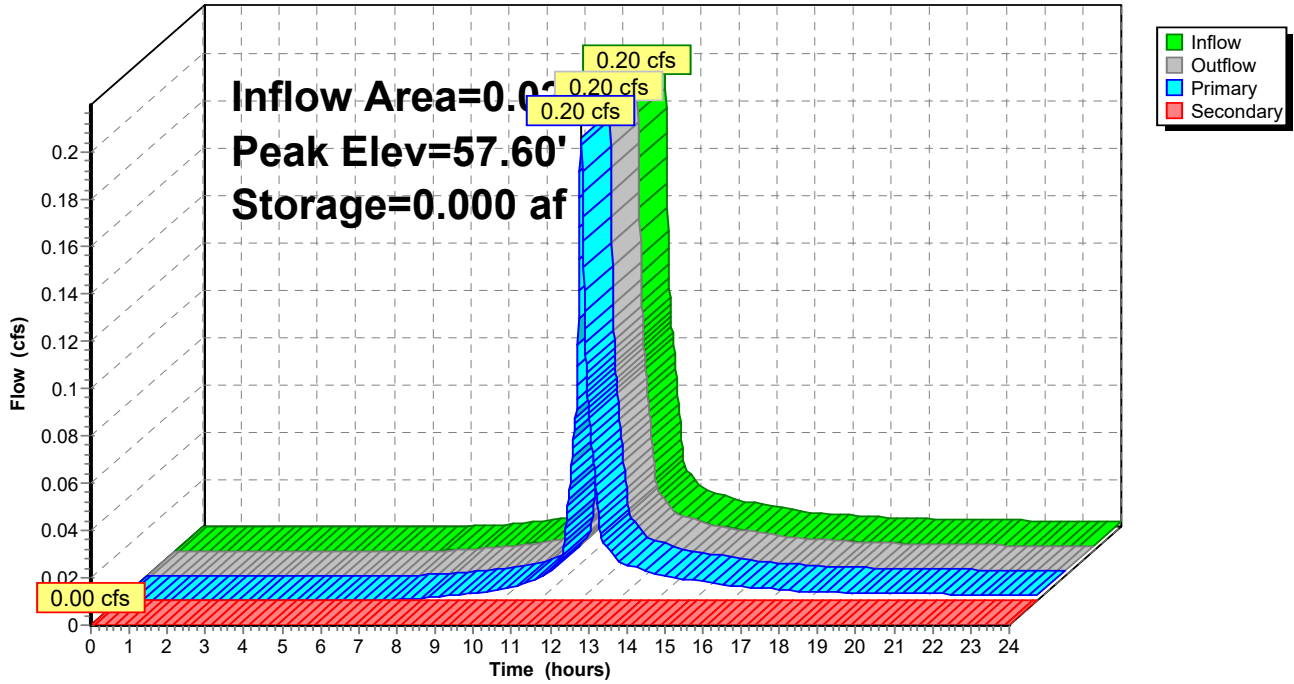
Device	Routing	Invert	Outlet Devices
#1	Primary	57.25'	6.0" Round Culvert L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 57.25' / 57.25' S= 0.0000' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	59.40'	24.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.20 cfs @ 12.08 hrs HW=57.60' TW=57.46' (Dynamic Tailwater)
 ↑1=Culvert (Barrel Controls 0.20 cfs @ 1.89 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=57.25' TW=57.17' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond ITA: Inf. Trench A

Hydrograph



Saratoga Way Post 1-7-2021

Type III 24-hr 50 yr Rainfall=8.44"

Prepared by Ross Engineering

Printed 1/7/2021

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Summary for Pond ITB: Inf. Trench B

Inflow Area = 0.078 ac, 60.46% Impervious, Inflow Depth > 6.76" for 50 yr event
 Inflow = 0.60 cfs @ 12.07 hrs, Volume= 0.044 af
 Outflow = 0.51 cfs @ 12.08 hrs, Volume= 0.044 af, Atten= 16%, Lag= 0.4 min
 Primary = 0.51 cfs @ 12.08 hrs, Volume= 0.044 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 57.00' @ 12.13 hrs Surf.Area= 0.004 ac Storage= 0.001 af

Plug-Flow detention time=4.3 min calculated for 0.044 af (100% of inflow)
 Center-of-Mass det. time=3.0 min (782.6 - 779.6)

Volume	Invert	Avail.Storage	Storage Description
#1	56.00'	0.005 af	2.00'W x 82.00'L x 3.00'H Prismatic 0.011 af Overall x 40.0% Voids

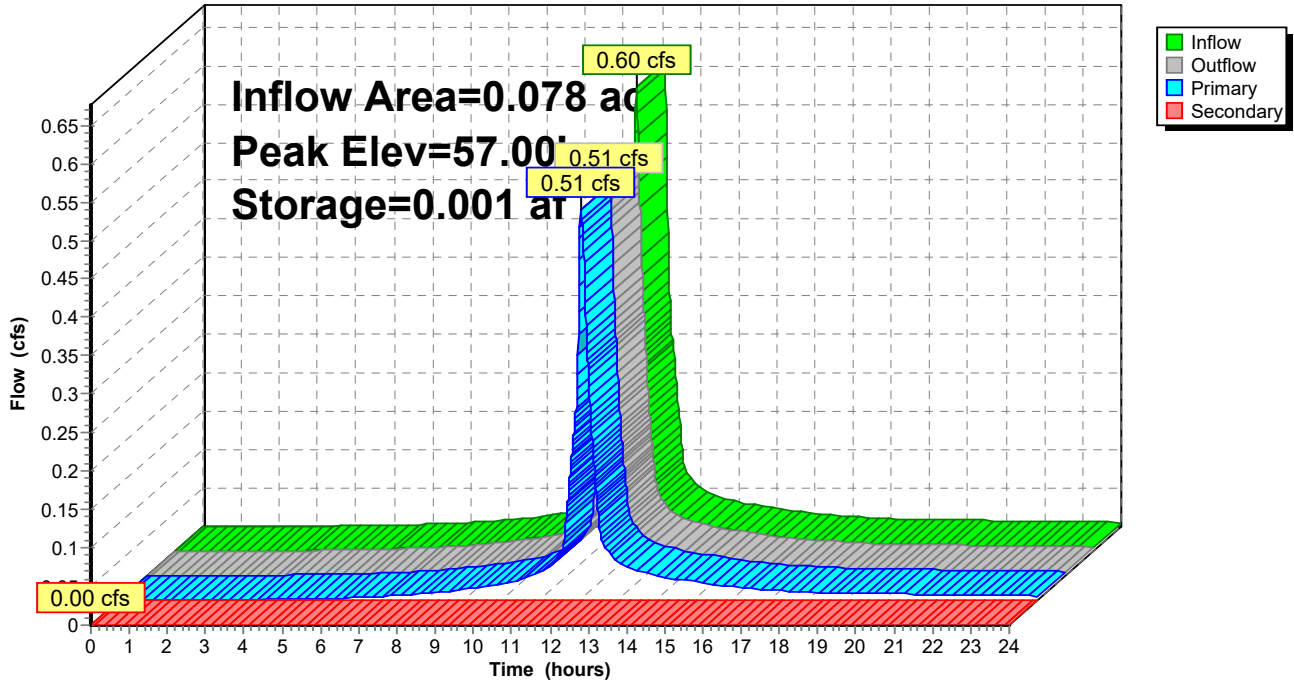
Device	Routing	Invert	Outlet Devices
#1	Primary	56.00'	6.0" Round Culvert L= 1.0' Ke= 0.500 Inlet / Outlet Invert= 56.00' / 56.00' S= 0.0000' /' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	58.90'	96.5' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Primary OutFlow Max=0.51 cfs @ 12.08 hrs HW=56.83' TW=56.54' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 0.51 cfs @ 2.59 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=56.00' TW=55.90' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond ITB: Inf. Trench B

Hydrograph



Saratoga Way Post 1-7-2021

Type III 24-hr 50 yr Rainfall=8.44"

Prepared by Ross Engineering

Printed 1/7/2021

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Summary for Pond PP: Pervious Pavement

Inflow Area = 0.879 ac, 23.23% Impervious, Inflow Depth > 5.01" for 50 yr event
 Inflow = 3.46 cfs @ 12.04 hrs, Volume= 0.367 af
 Outflow = 2.58 cfs @ 12.08 hrs, Volume= 0.365 af, Atten= 26%, Lag= 2.3 min
 Primary = 2.58 cfs @ 12.08 hrs, Volume= 0.365 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 57.33'@ 12.20 hrs Surf.Area= 2,718 sf Storage= 1,736 cf

Plug-Flow detention time=15.3 min calculated for 0.365 af (99% of inflow)
 Center-of-Mass det. time=11.7 min (843.9 - 832.2)

Volume	Invert	Avail.Storage	Storage Description
#1	55.00'	2,147 cf	Custom Stage Data (Prismatic) listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.00	2,718	0.0	0	0
55.01	2,718	40.0	11	11
56.42	2,718	40.0	1,533	1,544
56.43	2,718	15.0	4	1,548
56.67	2,718	15.0	98	1,646
56.68	2,718	5.0	1	1,647
57.33	2,718	5.0	88	1,735
57.34	2,718	30.0	8	1,744
57.67	2,718	30.0	269	2,013
57.68	2,718	15.0	4	2,017
58.00	2,718	15.0	130	2,147

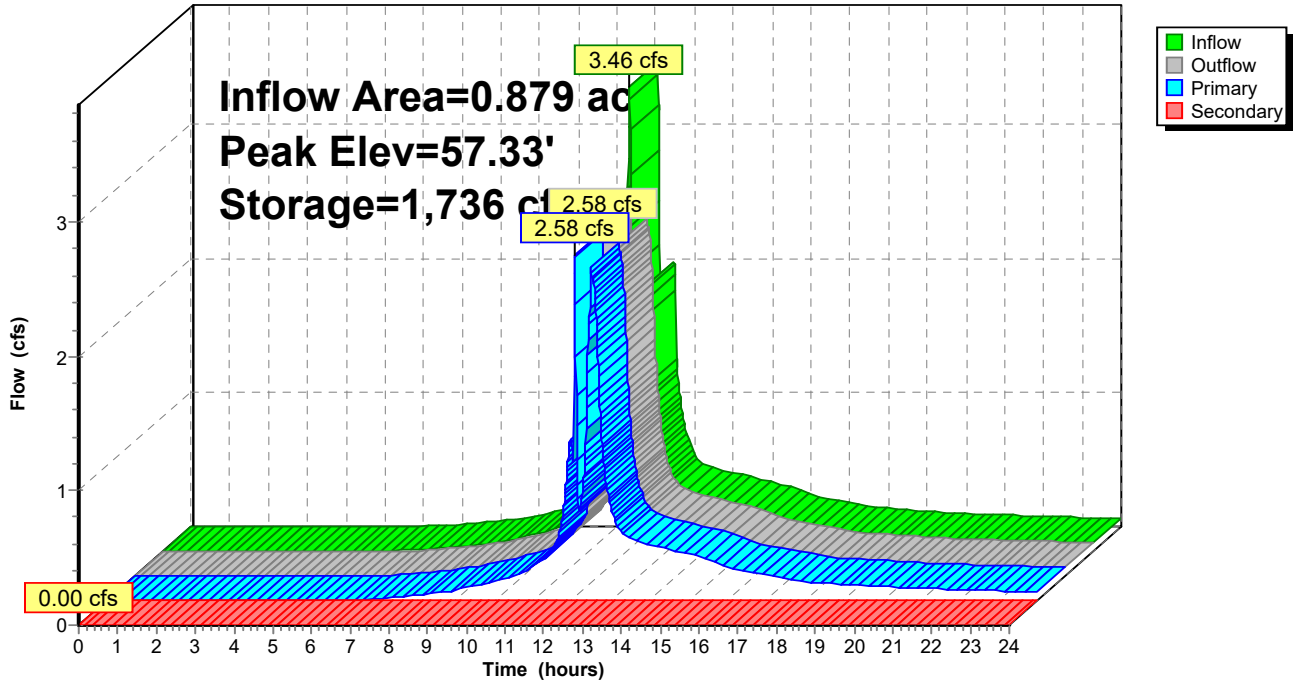
Device	Routing	Invert	Outlet Devices
#1	Primary	55.00'	10.0" Round Culvert X 2.00L= 10.0' Ke= 0.500 Inlet / Outlet Invert= 55.00' / 54.85' S= 0.0150 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.55 sf
#2	Secondary	57.90'	20.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Primary OutFlow Max=2.52 cfs @ 12.08 hrs HW=56.89' TW=56.66' (Dynamic Tailwater)
 ↑1=Culvert (Inlet Controls 2.52 cfs @ 2.31 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=55.00' TW=54.69' (Dynamic Tailwater)
 ↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PP: Pervious Pavement

Hydrograph



Summary for Pond RG: Rain Garden

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=1)

Inflow Area = 0.753 ac, 19.38% Impervious, Inflow Depth > 5.91" for 50 yr event
 Inflow = 5.18 cfs @ 12.08 hrs, Volume= 0.371 af
 Outflow = 4.40 cfs @ 12.10 hrs, Volume= 0.371 af, Atten= 15%, Lag= 1.1 min
 Primary = 3.45 cfs @ 12.04 hrs, Volume= 0.320 af
 Secondary= 2.66 cfs @ 12.13 hrs, Volume= 0.051 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 57.34' @ 12.19 hrs Surf.Area= 793 sf Storage= 802 cf

Plug-Flow detention time=3.2 min calculated for 0.371 af (100% of inflow)
 Center-of-Mass det. time=2.5 min (804.9 - 802.4)

Volume	Invert	Avail.Storage	Storage Description		
#1	55.20'	811 cf	Custom Stage Data (Conid) isted below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
55.20	607	0.0	0	0	607
55.21	607	40.0	2	2	608
56.50	607	40.0	313	316	721
56.51	400	100.0	5	321	928
57.00	607	100.0	245	566	1,138
57.35	800	100.0	245	811	1,334

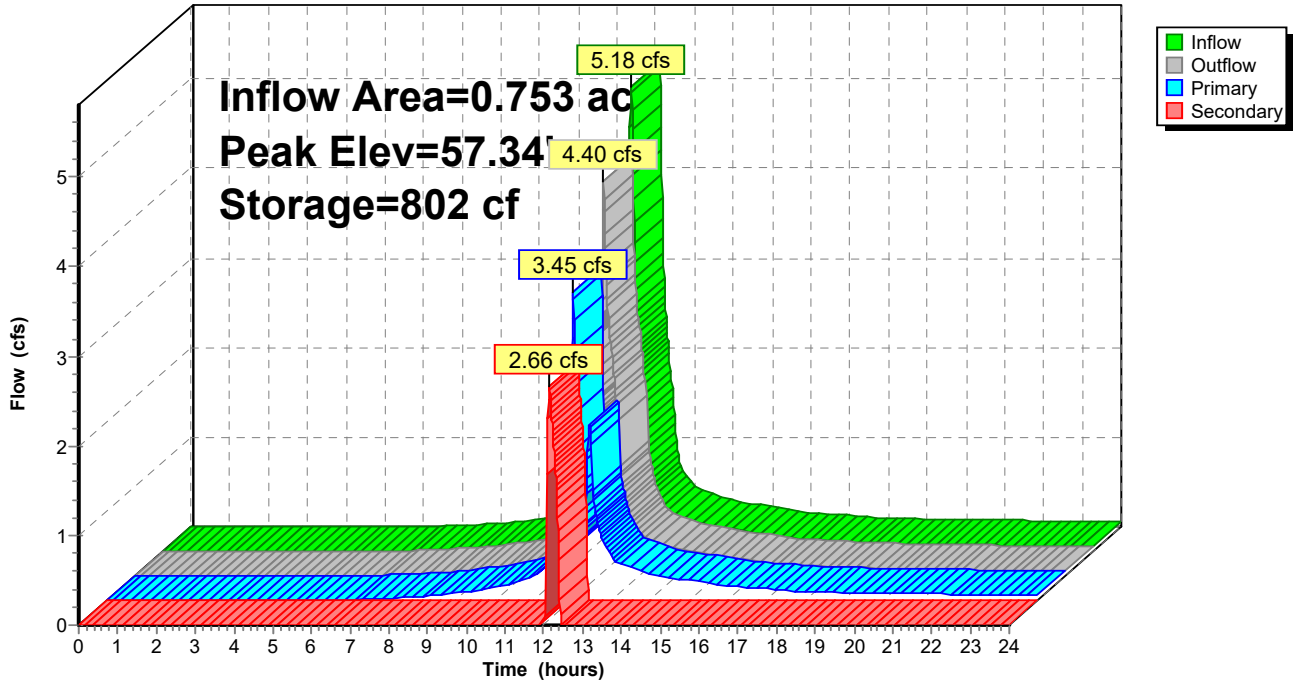
Device	Routing	Invert	Outlet Devices
#1	Secondary	56.90'	8.0' long x 2.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32
#2	Primary	55.20'	10.0" Round Culvert X 3.00L= 5.0' Ke= 0.500 Inlet / Outlet Invert= 55.20' / 55.15' S= 0.0100'/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.55 sf

Primary OutFlowMax=3.52 cfs @ 12.04 hrs HW=56.54' TW=56.34' (Dynamic Tailwater)
 ↑**2=Culvert** (Inlet Controls 3.52 cfs @ 2.15 fps)

Secondary OutFlowMax=2.66 cfs @ 12.13 hrs HW=57.25' TW=57.17' (Dynamic Tailwater)
 ↑**1=Broad-Crested Rectangular Weir** (Weir Controls 2.66 cfs @ 0.96 fps)

Pond RG: Rain Garden

Hydrograph



Saratoga Way Post 1-7-2021

Type III 24-hr 50 yr Rainfall=8.44"

Prepared by Ross Engineering

Printed 1/7/2021

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Summary for Pond SDP: Stone Det. Pond

Inflow Area = 1.345 ac, 21.36% Impervious, Inflow Depth > 5.72" for 50 yr event
 Inflow = 7.20 cfs @ 12.10 hrs, Volume= 0.641 af
 Outflow = 4.89 cfs @ 12.20 hrs, Volume= 0.640 af, Atten= 32%, Lag= 6.2 min
 Primary = 4.83 cfs @ 12.31 hrs, Volume= 0.638 af
 Secondary= 0.22 cfs @ 12.20 hrs, Volume= 0.001 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 3
 Peak Elev= 57.31'@ 12.20 hrs Surf.Area= 1,347 sf Storage= 1,489 cf

Plug-Flow detention time=4.2 min calculated for 0.639 af (100% of inflow)
 Center-of-Mass det. time=3.2 min (824.6 - 821.3)

Volume	Invert	Avail.Storage	Storage Description
#1	54.69'	2,499 cf	Custom Stage Data (Prismatic) listed below
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)
54.69	1	0.0	0
54.70	767	40.0	2
56.50	767	40.0	552
56.51	767	100.0	8
57.00	1,140	100.0	467
58.00	1,800	100.0	1,470
Cum.Store (cubic-feet)			
			0
			2
			554
			561
			1,029
			2,499

Device	Routing	Invert	Outlet Devices
#1	Primary	54.70'	15.0" Round Culvert L= 15.0' Ke= 0.500 Inlet / Outlet Invert= 54.70' / 54.50' S= 0.0133 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf
#2	Secondary	57.25'	5.0' long x 1.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#3	Device 1	54.70'	14.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=4.83 cfs @ 12.31 hrs HW=57.17' TW=56.29' (Dynamic Tailwater)

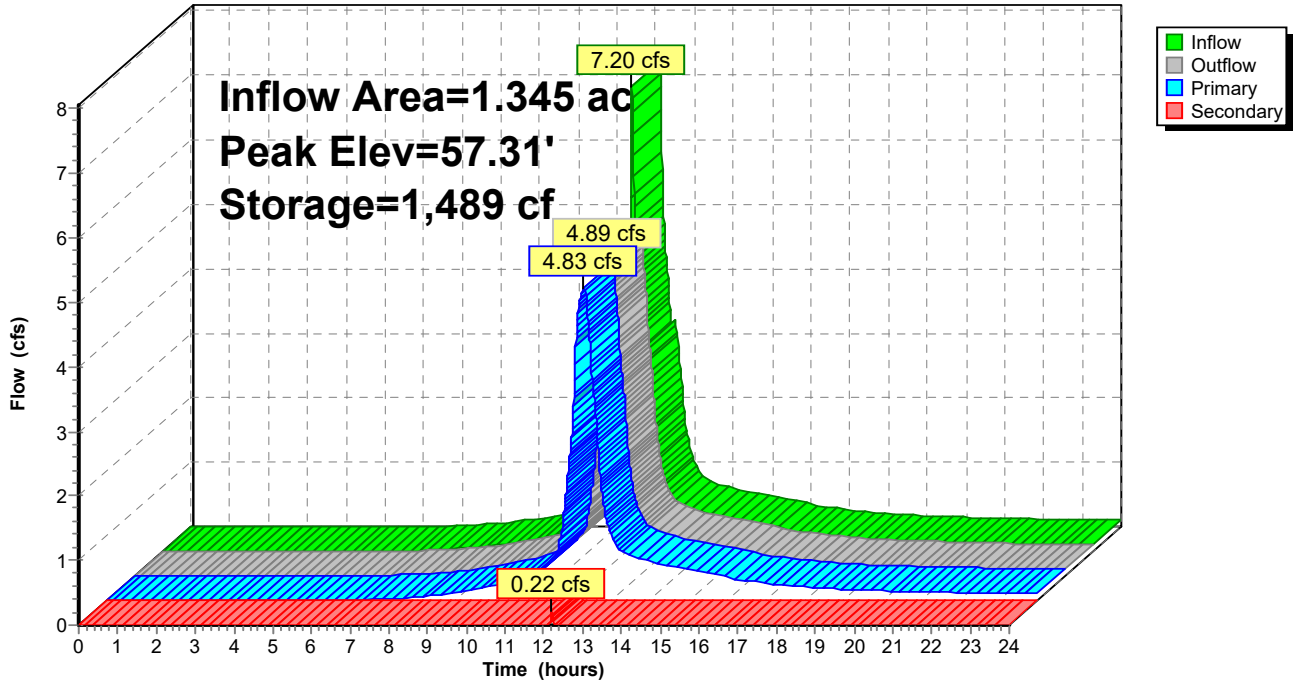
- ↑1=Culvert (Passes 4.83 cfs of 5.55 cfs potential flow)
- ↑3=Orifice/Grate (Orifice Controls 4.83 cfs @ 4.52 fps)

Secondary OutFlow Max=0.21 cfs @ 12.20 hrs HW=57.31' TW=56.49' (Dynamic Tailwater)

- ↑2=Broad-Crested Rectangular Weir (Weir Controls 0.21 cfs @ 0.68 fps)

Pond SDP: Stone Det. Pond

Hydrograph



Appendix - A

USDA Rainfall Charts

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	
Location	
Longitude	70.774 degrees West
Latitude	43.092 degrees North
Elevation	0 feet
Date/Time	Tue, 29 Sep 2020 15:00:07 -0400

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.81	1.03	1yr	0.70	0.98	1.21	1.56	2.02	2.65	2.91	1yr	2.34	2.80	3.20	3.93	4.52	1yr
2yr	0.32	0.50	0.62	0.81	1.02	1.30	2yr	0.88	1.18	1.51	1.93	2.48	3.20	3.55	2yr	2.83	3.42	3.92	4.66	5.30	2yr
5yr	0.37	0.58	0.73	0.97	1.24	1.60	5yr	1.07	1.46	1.88	2.42	3.13	4.05	4.56	5yr	3.58	4.38	5.01	5.90	6.67	5yr
10yr	0.41	0.65	0.82	1.11	1.44	1.88	10yr	1.25	1.72	2.22	2.88	3.73	4.84	5.50	10yr	4.28	5.29	6.05	7.07	7.94	10yr
25yr	0.48	0.76	0.96	1.33	1.76	2.32	25yr	1.52	2.13	2.76	3.61	4.71	6.14	7.06	25yr	5.43	6.79	7.75	8.96	9.99	25yr
50yr	0.53	0.85	1.09	1.53	2.06	2.74	50yr	1.78	2.51	3.27	4.30	5.63	7.34	8.54	50yr	6.50	8.21	9.35	10.73	11.90	50yr
100yr	0.59	0.96	1.24	1.75	2.40	3.23	100yr	2.07	2.96	3.87	5.12	6.72	8.80	10.32	100yr	7.79	9.92	11.29	12.86	14.19	100yr
200yr	0.67	1.09	1.41	2.03	2.80	3.80	200yr	2.42	3.49	4.58	6.08	8.02	10.54	12.48	200yr	9.33	12.00	13.63	15.42	16.91	200yr
500yr	0.79	1.30	1.69	2.46	3.44	4.72	500yr	2.97	4.35	5.71	7.64	10.14	13.39	16.05	500yr	11.85	15.43	17.50	19.60	21.35	500yr

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.59	0.73	0.88	1yr	0.63	0.87	0.92	1.32	1.67	2.21	2.47	1yr	1.96	2.37	2.84	3.17	3.85	1yr
2yr	0.31	0.49	0.60	0.81	1.00	1.19	2yr	0.86	1.16	1.36	1.82	2.34	3.04	3.43	2yr	2.69	3.30	3.80	4.52	5.05	2yr
5yr	0.35	0.54	0.67	0.92	1.17	1.40	5yr	1.01	1.37	1.61	2.12	2.74	3.77	4.16	5yr	3.33	4.00	4.69	5.50	6.20	5yr
10yr	0.38	0.59	0.73	1.02	1.32	1.60	10yr	1.14	1.56	1.80	2.40	3.07	4.34	4.82	10yr	3.84	4.64	5.39	6.36	7.14	10yr
25yr	0.44	0.66	0.83	1.18	1.55	1.90	25yr	1.34	1.85	2.10	2.77	3.55	4.66	5.84	25yr	4.12	5.61	6.57	7.71	8.61	25yr
50yr	0.48	0.73	0.91	1.30	1.76	2.16	50yr	1.52	2.12	2.34	3.09	3.95	5.25	6.73	50yr	4.65	6.47	7.62	8.93	9.92	50yr
100yr	0.53	0.81	1.01	1.46	2.00	2.47	100yr	1.72	2.41	2.62	3.44	4.37	5.89	7.76	100yr	5.22	7.46	8.84	10.36	11.44	100yr
200yr	0.59	0.88	1.12	1.62	2.26	2.81	200yr	1.95	2.75	2.93	3.81	4.82	6.58	8.95	200yr	5.83	8.60	10.24	12.04	13.21	200yr
500yr	0.68	1.01	1.30	1.89	2.69	3.36	500yr	2.32	3.29	3.40	4.36	5.50	7.63	10.79	500yr	6.75	10.37	12.43	14.69	15.97	500yr

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.44	0.54	0.72	0.89	1.08	1yr	0.76	1.06	1.25	1.74	2.21	2.98	3.15	1yr	2.63	3.03	3.57	4.36	5.02	1yr
2yr	0.33	0.52	0.64	0.86	1.06	1.26	2yr	0.92	1.24	1.48	1.96	2.52	3.41	3.69	2yr	3.02	3.55	4.07	4.82	5.61	2yr
5yr	0.40	0.61	0.76	1.05	1.33	1.61	5yr	1.15	1.58	1.88	2.53	3.25	4.32	4.95	5yr	3.82	4.76	5.35	6.35	7.13	5yr
10yr	0.47	0.72	0.89	1.24	1.60	1.97	10yr	1.38	1.92	2.28	3.10	3.95	5.31	6.18	10yr	4.70	5.95	6.80	7.81	8.72	10yr
25yr	0.57	0.87	1.08	1.55	2.03	2.55	25yr	1.75	2.50	2.95	4.06	5.13	7.78	8.32	25yr	6.88	8.00	9.13	10.30	11.37	25yr
50yr	0.67	1.01	1.26	1.81	2.44	3.11	50yr	2.11	3.04	3.58	4.98	6.29	9.74	10.44	50yr	8.62	10.04	11.42	12.68	13.92	50yr
100yr	0.78	1.18	1.48	2.14	2.93	3.78	100yr	2.53	3.69	4.36	6.13	7.72	12.20	13.09	100yr	10.80	12.59	14.29	15.64	17.04	100yr
200yr	0.91	1.38	1.74	2.52	3.52	4.61	200yr	3.04	4.51	5.32	7.55	9.47	15.32	16.44	200yr	13.56	15.80	17.91	19.28	20.87	200yr
500yr	1.13	1.69	2.17	3.15	4.48	5.98	500yr	3.87	5.84	6.90	9.96	12.45	20.72	22.21	500yr	18.34	21.36	24.16	25.44	27.29	500yr

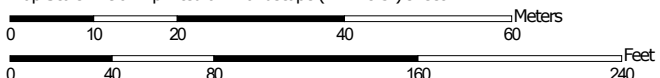


Appendix - B
Soil Information

Soil Map—Rockingham County, New Hampshire



Map Scale: 1:904 if printed on A landscape (11" x 8.5") sheet.




Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84




MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Rockingham County, New Hampshire

Survey Area Data: Version 22, May 29, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Sep 9, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
799	Urban land-Canton complex, 3 to 15 percent slopes	3.6	100.0%
Totals for Area of Interest		3.6	100.0%

Rockingham County, New Hampshire

799—Urban land-Canton complex, 3 to 15 percent slopes

Map Unit Setting

National map unit symbol: 9cq0
Elevation: 0 to 1,000 feet
Mean annual precipitation: 42 to 46 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 55 percent
Canton and similar soils: 20 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Canton

Setting

Parent material: Till

Typical profile

H1 - 0 to 5 inches: gravelly fine sandy loam
H2 - 5 to 21 inches: gravelly fine sandy loam
H3 - 21 to 60 inches: loamy sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High
(2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Ecological site: Well Drained Till Uplands (F144AY034CT)
Hydric soil rating: No

Minor Components

Udorthents

Percent of map unit: 5 percent
Hydric soil rating: No

Squamscott and scitico

Percent of map unit: 4 percent

Landform: Marine terraces

Hydric soil rating: Yes

Boxford and eldridge

Percent of map unit: 4 percent

Hydric soil rating: No

Chatfield

Percent of map unit: 4 percent

Hydric soil rating: No

Scituate and newfields

Percent of map unit: 4 percent

Hydric soil rating: No

Walpole

Percent of map unit: 4 percent

Landform: Depressions

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Rockingham County, New Hampshire

Survey Area Data: Version 22, May 29, 2020

STORMWATER MANAGEMENT OPERATION AND MAINTENANCE

Inspection and Maintenance of Facilities and Property

A. Maintenance of Common Facilities or Property

1. Future owners or assigns are responsible for maintenance of all stormwater infrastructure associated with the facility and the property. This includes the roof drainage system, stone infiltration beds, gravel areas, and the pervious pavement.

B. General Inspection and Maintenance Requirements

1. Permanent stormwater and sediment and erosion control facilities to be maintained on the site include but are not limited to the following:
 - a. Roof drainage System
 - b. Pervious Pavement
 - c. Crushed Stone Infiltration beds
 - d. Stone Detention Pond
 - e. Rain Garden
 - f. Stone Rip Rap
 - g. Catch Basins & Culverts
2. Maintenance of permanent measures shall follow the following schedule:
 - a. Driveway, Parking lot inspection at the end of every winter, prior to the start of the spring rain season. Sand/debris that has collected off the driveway and parking lot should be removed off-site and disposed of properly.
 - b. Annual inspection of the site for erosion, destabilization, settling, and sloughing. Any needed repairs are to be conducted immediately.
 - c. Annual inspection of site's vegetation and landscaping. Any areas that are bare shall be reseeded and mulched with hay or, if the case is extreme, loamed and seeded or sodded to ensure adequate vegetative cover. Landscape specimens shall be replaced in-kind, if they are found to be dead or dying.

Ross Engineering

909 Islington Street
Portsmouth, NH 03801

603-433-7560
alexross@comcast.net

- d. The following recommendations will help assure that the roof drainage system is maintained to preserve its effectiveness:
 - i. Initially, prior to a Certificate of Occupancy for the residential units, it should be tested by inserting a garden hose into the inlet and allowing the water to run at full strength for a minimum of one hour. The water should stay underground within the gravel. If water comes out of the overflow, the system should be further inspected and possibly replaced. This procedure should be performed every year during the annual inspection.
 - ii. In the spring and fall, visually inspect the area around the system and repair any erosion. Use small stones to stabilize erosion along drainage paths. Re-mulch any void areas by hand as needed. Also, inspect the roof collection and piping and clean and repair as necessary.
 - iii. Do not plant deep rooted trees and shrubs within 5' of the system.
 - iv. Keep heavy vehicles from driving or parking over the system.
- e. The following requirements will help assure that the pervious pavement system is maintained to preserve its effectiveness:
 - i. Inspection of site shall occur monthly for the first few months after construction. Then inspections can occur on an annual basis, preferably after rain events when clogging can occur and be obvious. Permeable pavement requires minimal maintenance; however maintenance is absolutely necessary to ensure a proper working system.
 - ii. Asphalt seal coating is absolutely forbidden. Surface seal coating is not reversible.
 - iii. Street sweepers with vacuums, water, and brushes can be used to restore permeability. Follow sweeping with high-pressure hosing of the surface pores. Surface should be vacuumed 4 times per year, and at any additional times sediment is spilled, eroded, or tracked onto the surface.
 - iv. Planted areas adjacent to pervious pavement should be well maintained to prevent soil washout onto the pavement. If any bare spots or eroded areas are observed within the planted areas, they should be replanted and/or stabilized at once.

Ross Engineering

909 Islington Street
Portsmouth, NH 03801

603-433-7560
alexross@comcast.net

- v. Immediately clean any soil deposited on pavement. Superficial dirt does not necessarily clog the voids. However, dirt that is ground in repeatedly by tires can lead to clogging. Therefore, trucks or other heavy vehicles should be prevented from tracking or spilling dirt onto the pavement.
 - vi. Do not allow construction staging, soil/mulch storage, etc. on unprotected pavement surface.
 - vii. No winter sanding. Mechanical snow and ice removal preferred.
 - viii. Deicing is permitted on pervious pavement in the winter. Minimize application of salt by reducing the application by 50% over traditional pavement.
 - viii. Written and verbal communication to the porous pavement's future owner should make clear the special purpose and special maintenance requirements such as those listed here.
- f. The following requirements will help assure that the stone infiltration system and stone detention pond are maintained to preserve their effectiveness:
- i. Inspected at least twice annually and following any rainfall event exceeding 2.5 inches in a 24 hour period.
 - ii. If system does not drain within 72 hours following a rainfall event, then a qualified professional engineer should assess the condition of the stone trench to determine measures required to restore infiltration function. Including, but not limited to, removal of accumulated sediments or reconstruction of the infiltration trench.
- g. The following requirements will help assure that the rain garden is maintained to preserve its effectiveness:
- i. Systems should be inspected at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24 hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
 - ii. Pretreatment measures should be inspected at least twice annually, and cleaned of accumulated sediment as warranted by inspection, but no less than once annually.
 - iii. Trash and debris should be removed at each inspection.

Ross Engineering

909 Islington Street
Portsmouth, NH 03801

603-433-7560
alexross@comcast.net

- iv. At least once annually, system should be inspected for drawdown time. If bioretention system does not drain within 72-hours following a rainfall event, then a qualified professional should assess the conditions of the facility to determine measures required to restore filtration function or infiltration function (as applicable), including but not limited to removal of accumulated sediments or reconstruction of the filter media.
- v. Vegetation should be inspected at least annually, and maintained in healthy conditions, including pruning, removal and replacement of dead or diseased vegetation, and removal of invasive species.
- h. The following requirements will help assure that the stone rip rap is maintained to preserve its effectiveness:
 - i. Inspect the outlet protection annually for damage and deterioration. Repair damages immediately.
- i. The following requirements will help assure that the catch basins and culverts are maintained to preserve their effectiveness:
 - i. Remove leaves and debris from catch basin grates on an as-needed basis.
 - ii. Catch basin sumps should be cleaned on an annual basis to protect water quality. Catch basin debris shall be disposed of at a solid waste disposal site.
 - iii. Culverts and drainage pipes should be inspected semi-annually, or more often as needed, for accumulation of debris and structural integrity. Leaves and other debris should be removed from the inlet and outlet to ensure the functionality of drainage structures. Debris shall be disposed of on site where it will not concentrate back at the drainage structures or at a solid waste disposal facility.
- j. Owners shall provide a report on activities performed throughout the year. Report shall include documentation that pavement cleaning is accomplished per this document and a certification that the system continues to function as designed.

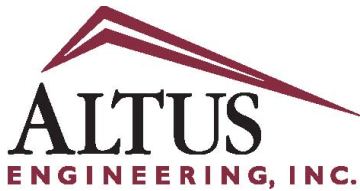
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Annual Operations and Maintenance Report

Activity	Date of Inspection	Who Inspected	Satisfactory: Yes, No, N/A	Maintenance Needed	Implemented date of corrective action	Findings of Inspector
Parking Lot Sweeping						
Parking Lot Pervious Pavement						
Roof Drainage System						
Stone Infiltration Trench						
Rain Garden						
Culverts & Catch Basins						
Stone Detention Pond						
Stone Rip-rap Apron & Stone 2:1 slope protection						



*Civil
Site Planning
Environmental
Engineering*

133 Court Street
Portsmouth, NH
03801-4413

December 21, 2020

Juliet T. H. Walker, Planning Director
Planning Department
1 Junkins Avenue, 3rd Floor
Portsmouth, NH

**Re: Peer Review No. 2 for Proposed Saratoga Way Condominium
Portsmouth Tax Map 212, Lots 112 and 113
Altus Project No. 5121**

Transmitted via email to: Juliet Walker

Dear Ms. Walker:

In accordance with Addendum 1 to our drainage review agreement with the City, Altus Engineering, Inc. (Altus) has reviewed the following documents prepared by Ross Engineering, LLC (Ross):

- A response letter addressing our comments from Ross, dated December 3, 2020.
- Plan set titled "Site Plan Review, Saratoga Way, Lots 112 & 113, Portsmouth, New Hampshire", prepared by Ross, and dated December 3, 2020.
- A report titled "Plan for Stormwater Management, For Property Located at: Saratoga Way, Tax Map 212, Lots 112 & 113, Portsmouth, NH 03801" prepared by Ross, dated December 3, 2020.
- A document titled "Stormwater Management Operation and Maintenance" prepared by Ross.

Altus notes that this review is limited to the drainage design and calculations prepared for the proposed development.

This review has been conducted to determine conformance with City of Portsmouth Regulations as well as the City's expectations and good engineering practices.

We are pleased to report that many of the issues identified in our previous review have been corrected. Ross has also significantly changed the design of the site, using an expanded rain garden and adding a porous pavement driveway. These changes are significant enough that many of our previous comments are no longer relevant.

Due to the changes, this review is being written as an entirely new document and without correlation to the items listed in our November 12, 2020 letter. Our comments are listed below.

PLAN SET

Sheet 2

1. The proposed rip rap apron extends beyond the lot line. The applicant will need to obtain permission from the property owner to perform the work.
2. The engineer should provide the size and depth of the rip rap on the 2:1 slope.
3. The top of the stone detention pond is 56.50 per the details, and thus the 56 contour should be removed.
4. The top of the berm elevation is called out as 56.16, however, the stormwater calculations show that the stormwater elevation in the rain garden reaches 56.29 in the 50-year storm event. The berm should be specified as 56.8 or greater for the rain garden providing 6 inches of freeboard. This will likely cause a narrowing of the neck connecting the raingarden. Hydraulic connection could be maintained via a subsurface culvert.

Sheet 4

5. The proposed grading will create a small impoundment area on lot 104-1. The applicant should seek to work with the lot owner to fill and grade the area to prevent ponding.
6. We believe the second (southwest) 60 contour adjacent to the driveway is in error. The contour should be removed.

Sheet 8

7. The infiltration trench detail should specify 4 inches minimum of stone underneath the perforated pipe.
8. The stone detention pond detail should include an inspection port to monitor the water level inside the practice.

Sheets 9

9. The pervious pavement detail needs to be revised to follow the UNH Stormwater Center guidelines for porous pavement. Below the choker course of $\frac{3}{4}$ inch stone, there should be 8 inches of filter material (bank run gravel, manufactured sand or modified 304.1 sand) followed by 3 inches of pea stone and then the reservoir course of $\frac{3}{4}$ inch stone. The inlet and outlet pipes should be within the reservoir course. There appears to be sufficient depth to provide for the layers.
10. The porous pavement detail should include an inspection port to monitor the water level inside the practice.
11. The "open graded" material needs to be specified. See item 8 for preferred material.
12. Note 8 under Maintenance Specifications for Porous Pavement requires signs for the porous pavement area. This is unnecessary for this application and the note should be removed.

STORMWATER MANAGEMENT ANALYSIS

Post-development Analysis

13. Sub-catchments 6S and 7S are routed to the porous pavement. Recommended practice is to increase the Tc for sub-catchments routed to porous pavement to reflect the time needed for the stormwater to pass through the multiple layers of the practice. A Tc of 150 to 200 minutes would seem reasonable here.
14. The pipe connected to pond CB B is modeled with zero slope. Adjust the invert at the culvert end to match the design plans.
15. The storage for pond PP (porous pavement) does not appear to reflect the assumed 40% voids.
16. The subsurface storage for pond RG (rain garden) does not appear to reflect the assumed 40% voids.
17. The outlet culverts for the porous pavement, rain garden and stone detention pond have an solid end cap with 24 half-inch holes drilled in them. The analysis should include a device modeled as 24 half inch diameter vertical orifices or an equivalent circular orifice restricting flow to the pipes to reflect the design details.

STORMWATER MANAGEMENT OPERATION AND MAINTENANCE MANUAL

18. The document should include required inspection and maintenance recommendations for:
 - a. The rain garden.
 - b. The stone detention pond.
 - c. The catch basins and culverts.
 - d. The rip rap apron and slope protection.

Altus concludes that while this plan represents progress, there remain some issues and details that need to be addressed. Addressing some of our concerns may drive some minor changes to the design which will require further review.

We look forward to working with the applicant to resolve the issues and to be able to make a full recommendation to the City.

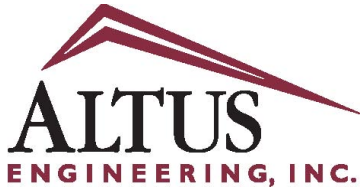
Respectfully,
Altus Engineering, Inc.



Dennis M. Moulton, PE
Project Engineer

DMM/5121 Review Letter No. 2 letterhead.docx

Ecopy: Eric Weinrieb, Altus



**Civil
Site Planning
Environmental
Engineering**

133 Court Street
Portsmouth, NH
03801-4413

January 14, 2021

Juliet T. H. Walker, Planning Director
Planning Department
1 Junkins Avenue, 3rd Floor
Portsmouth, NH 03801

**Re: Peer Review No. 3 for Proposed Saratoga Way Condominium
Portsmouth Tax Map 212, Lots 112 and 113
Altus Project No. 5121**

Transmitted via email to: Juliet Walker

Dear Ms. Walker:

At the City's request, Altus has reviewed the following documents from Ross Engineering, LLC (Ross).

- A response letter addressing our December 21, 2020 comments from Ross, dated January 7, 2021.
- Plan set titled "Site Plan Review, Saratoga Way, Lots 112 & 113, Portsmouth, New Hampshire", prepared by Ross, and dated January 7, 2020.
- A report titled "Plan for Stormwater Management, For Property Located at: Saratoga Way, Tax Map 212, Lots 112 & 113, Portsmouth, NH 03801" prepared by Ross, dated January 7, 2021.
- A document titled "Stormwater Management Operation and Maintenance" prepared by Ross.

The purpose of our review is to confirm that the issues identified in our December 21, 2021 review letter have been addressed. Altus notes that this review is limited to the drainage design and calculations prepared for the proposed development.

We are pleased to report that the issues identified in our previous review have been corrected.

Altus is satisfied that the design meets the City's requirements and exhibits good engineering practice.

We recommend that the City accept the plans and calculations as complete.

Respectfully,
Altus Engineering, Inc.

A handwritten signature in black ink that reads "Dennis M. Moulton".

Dennis M. Moulton, PE
Project Engineer

DMM/5121 Review Letter No. 3 letterhead.docx

Ecopy: Eric Weinrieb, Altus
Alex Ross, Ross Engineering, LLC